



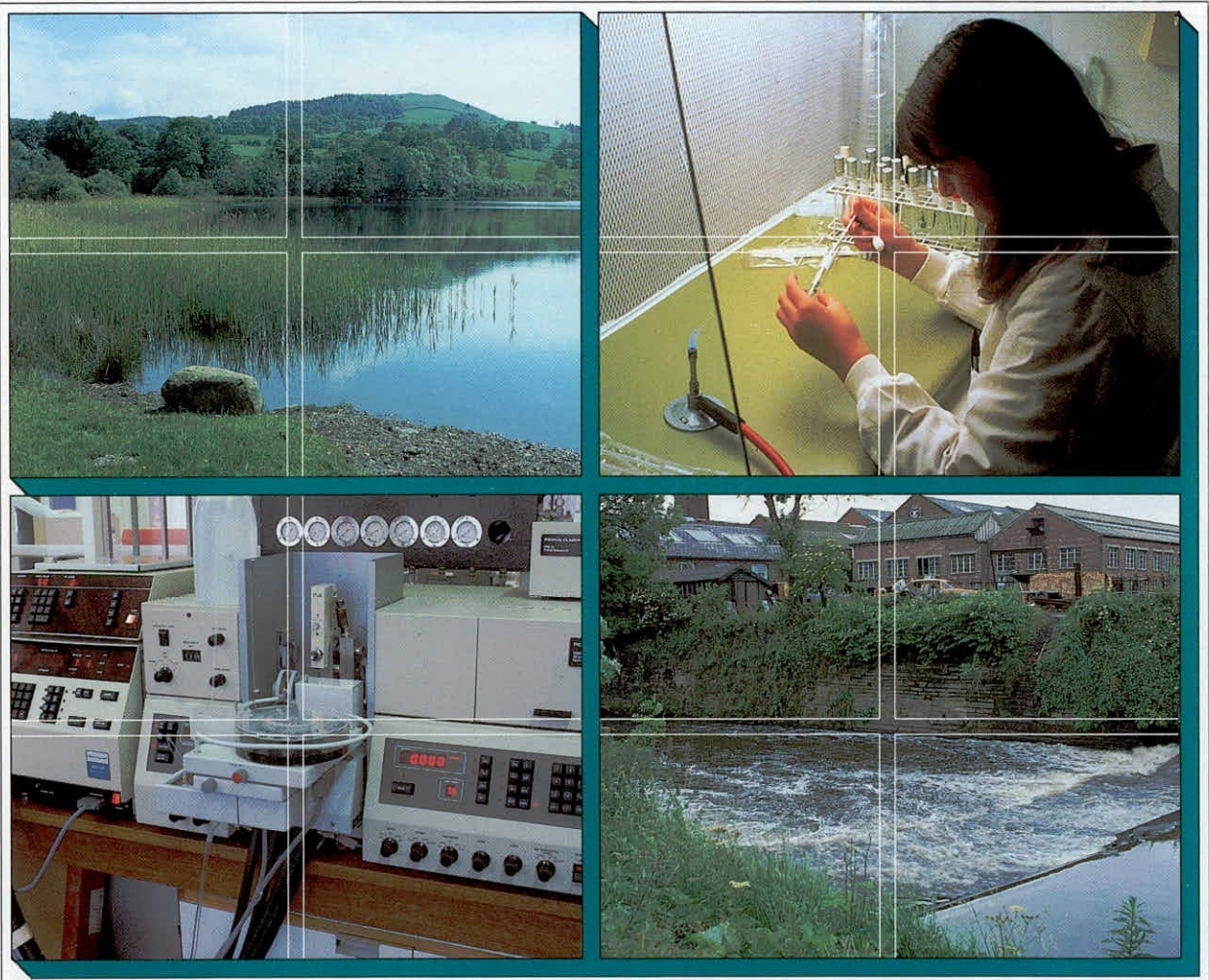
# **An audit of performance in the analysis of biological samples in 1995 Forth River Purification Board**

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Report To:  
IFE Report Ref. No:

Forth River Purification Board  
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# **An audit of performance in the analysis of biological samples in 1995. Forth River Purification Board**

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Project Leader:

R.J.M. Gunn

Report Date:

June 1996

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Forth River Purification Board

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## 1. INTRODUCTION

The 1995 General Quality Assessment (GQA) 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, the Industrial Research and Technology Unit (IRTU) undertook the work in Northern Ireland and the Government Laboratory covered the Isle of Man (IOM).

The majority of sites surveyed were sampled in two seasons, spring and autumn. Standard collection procedures were used and the sampling strategy was compatible with RIVPACS (River InVertebrate Prediction And Classification System), a computer model developed by the Institute of Freshwater Ecology (IFE).

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. Although attempts had been made to standardise sample processing and recording techniques, these did vary somewhat from region to region.

In order to undertake this massive programme of fieldwork and sample processing, a large number of staff, many of whom were relatively inexperienced, 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 a quality assurance exercise was necessary to minimise and quantify errors. Each laboratory appointed at least one experienced analyst to act as an internal analytical quality control (AQC) checker. For most agencies, these checkers re-sorted about 10% of the laboratory's samples, those samples chosen for re-sorting being selected at random. In addition, IFE was contracted to undertake an independent, external audit of the quality of the laboratory analysis of biological samples for each NRA region, each RPB, IRTU and IOM. This commission was consistent with the audit performed by IFE for the National River Quality Survey in 1990 and for the routine biological monitoring of river sites each year between 1991 and 1994. This audit was originally intended as a measure of the quality of the AQC analyses and is termed the main audit or AQC audit. The data collected for the 1995 GQA Survey was not adjusted for errors identified by either of the quality assurance procedures. Therefore the NRA contracted IFE to subject their samples to a further audit of the primary analysis (the primary audit) to provide an independent assessment of the quality of the Survey data.

This report presents the results of the 40 samples audited for Forth RPB. For samples that have been subjected to an internal AQC check, the results measure the performance of the AQC analyst rather than that of the primary analyst.

## **2. SAMPLE SELECTION**

Samples for audit were selected internally by each of the agencies being monitored. The number of samples selected for audit varied between the different agencies and the biologists processing these samples had no prior knowledge of which samples were to be audited. Some agencies only sent to IFE samples that had been processed twice. Others adopted a random selection process, whereby some samples had been analysed just once and some had been re-sorted. 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, IRTU and IOM 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 data sheet containing 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, without reference to the data sheet or to the vial of animals, and the BMWP families identified.
- b) The families contained within the vial were identified.
- c) A comparison was made between the listing of families and those found in the sample by IFE.
- d) A comparison was made between the listing of families and those identified from the vial by IFE.
- e) "Losses" or "gains" from the original 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. Single representatives of a "gained" taxon were noted as such.
- f) An error code, selected from a list on the result sheet, was assigned by the IFE auditor for each "loss" or "gain".

Occasionally a sample did not include a vial containing representative examples of the families listed on the data sheet, while some arrived with the vial damaged in transit such that the representative specimens were no longer separated. For these samples, only operations a), c), e) and f) above were appropriate.

Several directives were issued to IFE relating to the treatment of BMWP taxa. Every taxon recorded on the data sheet must be supported by a voucher specimen of that family in the vial (or, for very large specimens, left in the sample). The only exceptions to this rule were the native crayfish, *Austropotamobius pallipes*, the medicinal leech, *Hirudo medicinalis* and the pearl mussel, *Margaritifera margaritifera* (which does not belong to a BMWP family), all of which are protected species. Where possible, IFE gave the benefit of doubt to the analyst in cases of the "loss" of Planariidae, specimens of which have been known to disintegrate in preservative. Animals deemed to have been dead at the time of sampling, cast insect skins, pupal exuviae and empty mollusc shells were to be excluded from the listing of families present. Isolated posterior ends of "living" specimens were not acceptable as records of a taxon. In these cases, thorax plus abdomen was deemed acceptable but abdomen only was deemed unacceptable. Terrestrial representatives of BMWP scoring families were also to be excluded from the audit. For this reason, Clambidae, Chrysomelidae and Curculionidae, which appear in the BMWP list, were excluded for the purposes of the audit since most representatives of these families are, at best, only semi-aquatic. 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 and sent to the Regional Biologist. Copies of these report forms are presented in the Appendix. For audit samples where a vial of animals was included, the comparison between the listing of families and the taxa found in the vial by IFE was shown in the section of the report form headed "VIAL". Discrepancies could be due to carelessness, misidentifications or errors in completing the data sheet listing the families present. Families not on the listing but found by IFE in the remainder of the sample were entered in the section of the report form headed "SAMPLE" under "Additional BMWP taxa found by IFE". Taxa recorded here represent families missed by the analyst(s) on sorting the sample. When the families listed as "losses" in the first section 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 both as "losses" from the vial and as "gains" from the sample 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".

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 centre section of the report form under "species name".

IFE was asked to interpret each error to provide a possible cause. An error code, selected from a list of options at the foot of each result sheet, was entered against each taxon in the column headed "Presumed cause of error".



For those samples in which the vial of animals was damaged or missing, the "VIAL" sections of the report form were not applicable (N/a). Families not on the list but present in the sample were entered in the section under "SAMPLE" : "Additional taxa" as before. Families recorded on the list but not found by IFE were indicated in the section above this. 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.

The final section of the result sheet summarises the audit, giving details of the numbers of "losses", "gains" and "omissions", together with the net effects on BMWP score and the number of scoring taxa.

## **5. RESULTS**

The results of the audit for Forth RPB are summarised in Table 1. Table 2 displays the statistics of these regional audit results centered around the target of acceptability of no more than two missed taxa per sample. These data are presented for each analyst and for the RPB as a whole. Table 3 compares these results for each RPB laboratory. Table 4 presents data for Clyde RPB for the net effects of the audit on the BMWP score and number of taxa. This table is again based on the target of no more than two missed taxa per sample. The figure of 13 for an acceptable underestimate of BMWP score is based on twice the average score of all taxa in the BMWP listing (excluding Clambidae, Chrysomelidae and Curculionidae, which are excluded from the audit). This average score is 6.57. Table 5 compares this BMWP data for each RPB laboratory. Table 6 lists the taxa missed in sorting by Forth RPB's analysts in the 1995 audit and Table 7 lists all such taxa for the entire 1995 audit (Primary and AQC Audits for NRA regions and Main Audit for other organisations) for the whole of the UK.

## **6. ACKNOWLEDGEMENTS**

Grateful thanks to John Murray-Bligh of NRA Thames Region, who provided an invaluable service in the development and implementation of improved methodology and in providing helpful advice throughout.



Table 1. The 40 samples audited for Forth RPB

<b>River</b>	<b>Site</b>	<b>Analyst</b>	<b>Losses</b>	<b>Gains</b>	<b>Omissions</b>
<b>SPRING</b>					
Gairney Water	d/s Motorway	BOK/HT	0	2	0
Birns Water	Saltoun Hall	SdP/HT	0	1	0
Eas Gobhain	Gartchonzie Bridge	PW/KB	0	1	0
Crossford Burn	d/s Milesmark STW	HT/PW	0	0	0
Forth	Drip Bridge	KB/PW	1	3	1
Colstoun Water	Gifford	KB/PW	0	5	0
Bluther Burn	Balgownie Mains	KB/PW	0	4	0
Lochfitty Burn	A909 Bridge	KB/PW	0	2	0
Keithing Burn	Pargillis Bridge	KB/PW	0	1	0
Crail Burn	A917 Bridge	KB/PW	2	4	0
Alva Burn	u/s R.Devon	KB/SdP	0	1	0
Gogar Burn	Dalmahoy Church	KB/SdP	0	8	1
Leven	Auchmuir Bridge	KB/SdP	0	5	0
Teith	u/s Inverlochlarig Burn	PW/SdP	0	2	0
<b>SUMMER</b>					
Pow Burn	Airth Road Bridge	PW/BOK	0	0	1
Duchray Water	u/s R.Forth	PW/HT	0	0	0
Carron	Carron Bridge	PW/KB	2	2	0
Turk	Brig O'Turk	PW/KB	0	3	0
Avon	Strath House	HT/PW	0	0	0
Coillechat Burn	A84 Bridge	KB/SdP	1	1	0
Muckle Burn	B8033 Bridge	PW/SdP	0	2	0

Table 1 (cont).

<b>River</b>	<b>Site</b>	<b>Analyst</b>	<b>Losses</b>	<b>Gains</b>	<b>Omissions</b>
<b>AUTUMN</b>					
Couston Water	Kinnenhill Bridge	HT/BOK	0	1	0
Almond	East Whitburn	HT/BOK	0	0	0
Greens Burn	Damleys Cottage	BOK/HT	0	1	0
Gairney Water	d/s Motorway	BOK/HT	0	5	0
Kilrenny Burn	A917 Bridge	KB/HT	0	3	1
Ore	Bowhill Bridge	KB/HT	0	0	0
Lochty Burn	Ballingry	KB/HT	0	1	0
Almond	Cowhill	KB/HT	0	1	0
Crossford Burn	d/s Milesmark STW	KB/HT	0	1	0
Rashiehill Burn	Greenhill	HT/KB	0	3	0
Almond	Fauldhouse Road Bridge	HT/KB	0	0	0
Bog Burn	Whiteside	HT/KB	0	0	0
Dollar Burn	u/s R.Devon	BOK/PW	0	3	0
Water of Leith	Currie	SdP/PW	0	0	0
Cock Burn	Whelpside	SdP/PW	0	1	0
Fullarton Water	B6372 Bridge	SdP/PW	1	1	0
South Esk	d/s Moorfoot	SdP/PW	0	1	0
Gore Water	u/s Confluence	SdP/PW	0	0	0
Garbethill Burn	Fannyside Mill Farm	HT/SdP	0	1	0

Table 2. Statistics of 1995 audit results for Forth RPB

<b>Analyst</b>	<b>n</b>	<b>Mean gains</b>	<b>Standard error</b>	<b>No.samples &gt;2 gains</b>	<b>% samples &gt;2 gains</b>	<b>Highest no. gains</b>	<b>Mean errors (l+g+o)</b>	<b>Standard error</b>
BOK	3	0.33	0.33	0	0.00	1	0.67	0.33
HT	10	1.50	0.48	2	20.00	5	1.60	0.52
KB	6	1.50	0.56	2	33.33	3	1.83	0.70
PW	14	1.79	0.46	5	35.71	5	2.14	56.00
SdP	7	2.86	1.01	2	28.57	8	3.14	1.10
<b>Forth RPB</b>	<b>40</b>	<b>1.75</b>	<b>0.29</b>	<b>11</b>	<b>27.50</b>	<b>8</b>	<b>2.03</b>	<b>0.33</b>

Table 3. Summary of errors found in 1995 audit for each RPB

<b>RPB</b>	<b>n</b>	<b>Mean gains</b>	<b>Standard error</b>	<b>No.samples &gt;2 gains</b>	<b>% samples &gt;2 gains</b>	<b>Highest no. gains</b>	<b>Mean errors (l+g+o)</b>	<b>Standard error</b>
Clyde	42	1.00	0.16	5	11.90	3	1.21	0.18
Forth	40	1.75	0.29	11	27.50	8	2.03	0.33
Highland	12	2.42	0.58	4	33.33	6	2.75	0.55
North East	34	2.06	0.31	11	32.35	6	2.21	0.32
Solway	7	1.00	0.38	0	0.00	2	1.00	0.38
Tay	10	1.20	0.29	1	10.00	3	1.40	0.31
Tweed	6	0.67	0.21	0	0.00	1	1.00	0.26
<b>All RPBs</b>	<b>151</b>	<b>1.55</b>	<b>0.13</b>	<b>32</b>	<b>21.19</b>	<b>8</b>	<b>1.77</b>	<b>0.14</b>

Table 4. Net effects of the Audit on BMWP score and number of scoring taxa

<b>RPB</b>	<b>n</b>	<b>Mean net effect on BMWP score</b>	<b>% of samples underestimated by score &gt;13</b>	<b>Maximum underestimate of BMWP score</b>	<b>Mean net effect on no. of taxa</b>	<b>% of samples underestimated by &gt;2 taxa</b>	<b>Maximum underestimate of no. of taxa</b>
BOK	3	1.33	0.00	4	0.33	0.00	1
HT	10	7.50	10.00	29	1.50	20.00	5
KB	6	8.50	33.33	23	1.40	40.00	3
PW	14	11.43	42.86	33	1.50	21.43	5
SdP	7	18.86	28.57	63	2.71	28.57	8
<b>Forth RPB</b>	<b>40</b>	<b>10.55</b>	<b>27.50</b>	<b>63</b>	<b>1.57</b>	<b>22.50</b>	<b>8</b>

Table 5. Summary of errors found in 1995 audit for each RPB

<b>RPB</b>	<b>n</b>	<b>Mean net effect on BMWP score</b>	<b>% of samples underestimated by score &gt;13</b>	<b>Maximum underestimate of BMWP score</b>	<b>Mean net effect on no. of taxa</b>	<b>% of samples underestimated by &gt;2 taxa</b>	<b>Maximum underestimate of no. of taxa</b>
Clyde	42	6.50	16.67	27	0.83	11.90	3
Forth	40	10.55	27.50	63	1.57	22.50	8
Highland	12	14.83	50.00	47	2.17	25.00	6
North East	34	12.76	38.24	41	2.00	32.35	6
Solway	7	7.14	28.57	20	1.00	0.00	2
Tay	10	6.70	20.00	15	1.10	10.00	3
Tweed	6	2.17	0.00	7	0.50	0.00	1
<b>All RPBs</b>	<b>151</b>	<b>9.52</b>	<b>27.15</b>	<b>63</b>	<b>1.41</b>	<b>19.21</b>	<b>8</b>

Table 6. Taxa missed by Forth RPB's analysts

Family	n	% of Forth RPB's missed taxa in audit	% of missed taxa in audit for all RPBs
Hydrophilidae (incl. Hydraenidae)	9	13.64	7.17
Sphaeriidae	4	6.06	4.48
Odontoceridae	3	4.55	1.79
Leptophlebiidae	3	4.55	3.59
Ephemerellidae	3	4.55	3.14
Sericostomatidae	2	3.03	2.24
Lymnaeidae	2	3.03	3.59
Leptoceridae	2	3.03	3.14
Planorbidae	2	3.03	1.79
Scirtidae	2	3.03	1.35
Simuliidae	2	3.03	3.14
Hydroptilidae	2	3.03	3.14
Goeridae	2	3.03	2.69
Rhyacophilidae (incl. Glossosomatidae)	2	3.03	3.14
Dytiscidae (incl. Noteridae)	2	3.03	2.24
Baetidae	2	3.03	1.79
Haliplidae	2	3.03	1.79
Glossiphoniidae	2	3.03	1.79
Sialidae	1	1.52	0.90
Beraeidae	1	1.52	0.90
Tipulidae	1	1.52	1.35
Heptageniidae	1	1.52	1.35
Valvatidae	1	1.52	0.90
Hydropsychidae	1	1.52	1.35
Capniidae	1	1.52	1.35
Ancylidae (incl. Acroloxidae)	1	1.52	0.90
Planariidae (incl. Dugesiidae)	1	1.52	4.04
Caenidae	1	1.52	4.04
Perlidae	1	1.52	0.90
Oligochaeta	1	1.52	0.90
Gammaridae (incl. Crangonyctidae)	1	1.52	0.45
Nemouridae	1	1.52	2.69
Limnephilidae	1	1.52	2.69
Leuctridae	1	1.52	2.24
Lepidostomatidae	1	1.52	1.35
Psychomyiidae (incl. Ecnomidae)	1	1.52	3.59

Table 7. Missed taxa for all samples in 1995 audit

Family	n	% of all missed taxa in 1995 audit
Hydrophilidae (incl. Hydraenidae)	68	5.97
Hydroptilidae	59	5.18
Sphaeriidae	52	4.57
Hydrobiidae (incl. Bithyniidae)	50	4.39
Planariidae (incl. Dugesiidae)	46	4.04
Caenidae	40	3.51
Elmidae	39	3.42
Leptoceridae	39	3.42
Psychomyiidae (incl. Ecnomidae)	39	3.42
Lymnaeidae	33	2.90
Simuliidae	32	2.81
Nemouridae	31	2.72
Limnephilidae	30	2.63
Planorbidae	29	2.55
Halplidae	28	2.46
Tipulidae	25	2.19
Baetidae	23	2.02
Glossiphoniidae	22	1.93
Goeridae	22	1.93
Leptophlebiidae	22	1.93
Dytiscidae (incl. Noteridae)	21	1.84
Ephemerellidae	20	1.76
Valvatidae	20	1.76
Hydropsychidae	18	1.58
Ancylidae (incl. Acroloxidae)	16	1.40
Asellidae	16	1.40
Leuctridae	16	1.40
Piscicolidae	16	1.40
Rhyacophilidae (incl. Glossosomatidae)	16	1.40
Sciirtidae	16	1.40
Sericostomatidae	15	1.32
Gyrinidae	14	1.23
Erpobdellidae	13	1.14
Lepidostomatidae	13	1.14
Polycentropodidae	13	1.14
Chloroperlidae	11	0.97
Odontoceridae	11	0.97
Dendrocoelidae	10	0.88
Heptageniidae	10	0.88

Table 7. (cont.)

Family	n	% of all missed taxa in 1995 audit
Gammaridae (incl. Crangonyctidae)	9	0.79
Taeniopterygidae	9	0.79
Hydrometridae	8	0.70
Oligochaeta	8	0.70
Physidae	7	0.61
Chironomidae	6	0.53
Coenagriidae	6	0.53
Perlidae	6	0.53
Brachycentridae	5	0.44
Calopterygidae	5	0.44
Perlodidae	5	0.44
Sialidae	5	0.44
Beraeidae	4	0.35
Corixidae	4	0.35
Corophiidae	4	0.35
Ephemeridae	4	0.35
Unionidae	4	0.35
Capniidae	3	0.26
Dryopidae	3	0.26
Gerridae	3	0.26
Libellulidae	3	0.26
Siphonuridae	3	0.26
Aphelocheiridae	2	0.18
Neritidae	2	0.18
Platycnemididae	2	0.18
Aeshnidae	1	0.09
Cordulegasteridae	1	0.09
Notonectidae	1	0.09
Philopotamidae	1	0.09
Viviparidae	1	0.09



## **APPENDIX**

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

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 28.4.95

WATER-

PRIMARY

AQC

COURSE: Gairney Water

ANALYST: BOK

ANALYST: HT

SITE: d/s Motorway

CODE: 1397

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Capniidae	Capnia sp. (C.bifrons?)	9
Sphaeriidae	Pisidium sp. 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 13

ON NO. OF TAXA 2

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Birns Water

LABORATORY: Riccarton  
PRIMARY  
ANALYST: SdP

DATE: 20.4.95  
AQC  
ANALYST: HVHT  
SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Sphaeriidae	Pisidium sp. 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 3

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 21.3.95

WATER-

PRIMARY

AQC

COURSE: Eas Gobhain

ANALYST: PW

ANALYST: KB

SITE: Gartchonzie Bridge

CODE: 1576

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Leuctridae	Leuctra inermis 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 10

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 8.3.95

WATER-  
COURSE: Crossford Burn

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: PW

SITE: d/s Milesmark STW

CODE: 6279

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample (no net loss or gain)

# EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 9.3.95

WATER-

PRIMARY

AQC

COURSE: Forth

ANALYST: KB

ANALYST: PW

SITE: Drip Bridge

CODE: 3663

SORT/AQC

METHOD: Preserved/Preserved

## RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

Nemouridae	Darkened Isoperla grammatica	7
Planariidae (incl. Dugesiidae) *	Damaged Ancylus fluviatilis	7

#### Additional BMWP taxa found by IFE

Leptophlebiidae	Leptophlebia sp.?	12
Sericostomatidae	Sericostoma personatum	12

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Planariidae (incl. Dugesiidae) *	Polycelis felina 1 only	7
Rhyacophilidae (incl. Glossosomatidae)	Agapetus sp. 1 only	9

## SUMMARY OF AUDIT

LOSSES 1

GAINS 3

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 20

ON NO. OF TAXA 2

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 20.4.95

WATER-  
COURSE: Colstoun Water

PRIMARY  
ANALYST: KB

AQC  
ANALYST: PW

SITE: Gifford

CODE: 4474

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Glossiphoniidae	Helobdella stagnalis 1 only	9
Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adults)	9
Dytiscidae (incl. Noteridae)	Oreodytes sanmarkii (adult) 1 only	9
Lepidostomatidae	Crunoecia irrorata 1 only	9
Perlidae	Dinocras cephalotes 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 5

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 33

ON NO. OF TAXA 5

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)



## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Bluther Burn  
SITE: Balgownie Mains

LABORATORY: Riccarton  
PRIMARY  
ANALYST: KB  
CODE: 3539

DATE: 9.3.95  
AQC  
ANALYST: PW  
SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Leptophlebiidae	Paraleptophlebia sp. 1 only	9
Sericostomatidae	Sericostoma personatum	9
Nemouridae	Amphinemura sp.	9
Halplidae	Brychius elevatus (adult) 1 only	9

### SUMMARY OF AUDIT

LOSSES 0      GAINS 4      OMISSIONS: 0

#### NET EFFECTS:

ON BMWP SCORE 32  
ON NO. OF TAXA 4

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample (no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 25.5.95

WATER-

PRIMARY

AQC

COURSE: Lochfitty Burn

ANALYST: KB

ANALYST: PW

SITE: A909 Bridge

CODE: 3474

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Odontoceridae	Odontocerum albicorne	9
Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 15

ON NO. OF TAXA 2

1 No representative of family in vial

5 Specimen dead at time of sampling

9 Taxon missed in sorting

2 Alternative terrestrial specimen in vial

6 Taxon in vial but not recorded

10 Unexplained error

3 Posterior end only in vial

7 Mis-identification

11 Taxon added in internal AQC

4 Empty shell or case or cast skin in vial

8 Typographical error - wrong box ticked

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 23.3.95

WATER-  
COURSE: Keithing Burn

PRIMARY  
ANALYST: KB

AQC  
ANALYST: PW

SITE: Pargillis Bridge

CODE: 1479

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

Lymnaeidae

Lymnaea sp. (juvenile) 1 only

6

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 3

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample (no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Crail Burn

LABORATORY: Riccarton  
PRIMARY  
ANALYST: KB

DATE: 27.4.95  
AQC  
ANALYST: PW  
SORT/AQC  
METHOD: Preserved/Preserved

SITE: A917 Bridge

CODE: 1369

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

Valvatidae	Empty Zonitoides sp. in vial	2
Sphaeriidae	Pisidium sp.	4

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Scirtidae	Elodes sp. (larva) 1 only	9
Lymnaeidae	Lymnaea truncatula 1 only	9
Ancylidae (incl. Acroloxidae)	Ancylus fluviatilis	9
Rhyacophilidae (incl. Glossosomatidae)	Agapetus sp.	9

### SUMMARY OF AUDIT

LOSSES 2

GAINS 4

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 15  
ON NO. OF TAXA 2

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 27.4.95

WATER-

PRIMARY

AQC

COURSE: Alva Burn

ANALYST: KB

ANALYST: SdP

SITE: u/s R.Devon

CODE: 3977

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

# EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 15.5.95

WATER-  
COURSE: Gogar Burn

PRIMARY  
ANALYST: KB

AQC  
ANALYST: SdP

SITE: Dalmahoy Church

CODE: 409

SORT/AQC  
METHOD: Preserved/Preserved

## RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

Sphaeriidae \* 1

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Glossiphoniidae	Helobdella stagnalis	12
Heptageniidae	Rhithrogena semicolorata/germanica	9
Leptophlebiidae	Habrophlebia fusca	9
Ephemerellidae	Ephemerella ignita	9
Sericostomatidae	Sericostoma personatum 1 only	9
Psychomyiidae (incl. Ecnomidae)	Tinodes waeneri	9
Caenidae	Caenis rivulorum	9
Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9
Sphaeriidae *	Pisidium sp.	1

## SUMMARY OF AUDIT

LOSSES 0

GAINS 8

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 63

ON NO. OF TAXA 8

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

# EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 5.5.95

WATER-  
COURSE: Leven

PRIMARY  
ANALYST: KB

AQC  
ANALYST: SdP

SITE: Auchmuir Bridge

CODE: 1388

SORT/AQC  
METHOD: Preserved/Preserved

## RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Dytiscidae (incl. Noteridae)	Potamonectes depressus (adult) 1 only	9
Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis, H. riparia (adults)	9
Valvatidae	Valvata piscinalis 1 only	9
Planorbidae	Gyraulus albus (empty shell in vial)	12
Leptoceridae	Athripsodes cinereus 1 only	9

## SUMMARY OF AUDIT

LOSSES 0

GAINS 5

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 26

ON NO. OF TAXA 5

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample (no net loss or gain)



## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 22.3.95

WATER-  
COURSE: Teith

PRIMARY  
ANALYST: PW

AQC  
ANALYST: SdP

SITE: u/s Inverlochlarig Burn

CODE: 3450

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydroptilidae	Hydroptila sp. 1 only	9
Oligochaeta	Indet Lumbriculidae 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 7  
ON NO. OF TAXA 2

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 19.7.95

WATER-

PRIMARY

AQC

COURSE: Pow Burn

ANALYST: PW

ANALYST: BO'K

SITE: Airth Road Bridge

CODE: 1604

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

Hydrophilidae (incl. Hydraenidae) \*

1

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae) \*

Hydraena gracilis (adult) 1 only

1

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 22.8.95

WATER-  
COURSE: Duchray Water

PRIMARY  
ANALYST: PW

AQC  
ANALYST: HVHT

SITE: u/s R.Forth

CODE: 3231

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 10.8.95

WATER-  
COURSE: Carron

PRIMARY  
ANALYST: PW

AQC  
ANALYST: KB

SITE: Carron Bridge

CODE: 3226

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

Lepidostomatidae	Sericostoma personatum	7
Caenidae		1

#### Additional BMWP taxa found by IFE

Sericostomatidae	Sericostoma personatum (juvenile) 1 only	7
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### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9
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### SUMMARY OF AUDIT

LOSSES 2

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -2

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in-vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 10.7.95

WATER-  
COURSE: Turk

PRIMARY  
ANALYST: PW

AQC  
ANALYST: KB

SITE: Brig O'Turk

CODE: 3241

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Odontoceridae	Odontocerum albicorne 1 only	9
Leptoceridae	Ceraclea dissimilis 1 only	9
Sphaeriidae	Pisidium sp. 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 23

ON NO. OF TAXA 3

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 25.7.95

WATER-  
COURSE: Avon

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: PW

SITE: Strath House

CODE: 335

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 17.7.95

WATER-

PRIMARY

AQC

COURSE: Coillechat Burn

ANALYST: KB

ANALYST: SdP

SITE: A84 Bridge

CODE: 3617

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

Oligochaeta

Posterior end only

11

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Leptophlebiidae

Paraleptophlebia sp. 1 only

9

### SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 9

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Muckle Burn  
SITE: B8033 Bridge

LABORATORY: Riccarton  
PRIMARY  
ANALYST: PW  
CODE: 3194

DATE: 22.8.95  
AQC  
ANALYST: SdP  
SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydroptilidae	Hydroptila sp. 1 only	9
Gammaridae (incl. Crangonyctidae)	Gammarus sp. 1 only	9

### SUMMARY OF AUDIT

LOSSES 0      GAINS 2      OMISSIONS: 0

#### NET EFFECTS:

ON BMWP SCORE 12  
ON NO. OF TAXA 2

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)



## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 9.11.95

WATER-  
COURSE: Couston Water

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: BOK

SITE: Kinnenhill Bridge

CODE: 1312

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Baetidae

Baetis rhodani

9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 4

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 7.11.95

WATER-  
COURSE: Almond

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: BOK

SITE: East Whitburn

CODE: 1027

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Greens Burn

LABORATORY: Riccarton  
PRIMARY  
ANALYST: BOK

DATE: 31.10.95  
AQC  
ANALYST: HVHT  
SORT/AQC  
METHOD: Preserved/Preserved

SITE: Damleys Cottage

CODE: 3418

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Baetidae	Baetis rhodani 1 only	9
----------	-----------------------	---

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 4  
ON NO. OF TAXA 1

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Gairney Water  
SITE: d/s Motorway

LABORATORY: Riccarton  
PRIMARY  
ANALYST: BOK  
CODE: 1397

DATE: 31.10.95  
AQC  
ANALYST: HVHT  
SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Halipidae	Halipus sp. (larva) 1 only	9
Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9
Simuliidae	Simulium ornatum group	9
Sialidae	Sialis lutaria 1 only	9
Ephemerellidae	Ephemerella ignita 1 only	9

### SUMMARY OF AUDIT

LOSSES 0      GAINS 5

OMISSIONS: 0

#### NET EFFECTS:

ON BMWP SCORE 29  
ON NO. OF TAXA 5

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 18.10.95

WATER-

COURSE: Kilrenny Burn

PRIMARY

ANALYST: KB

AQC

ANALYST: HVHT

SITE: A917 Bridge

CODE: 3394

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

Hydrobiidae (incl. Bithyniidae) \*

4

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Sphaeriidae

Pisidium sp.

12

Lymnaeidae

Lymnaea truncatula/palustris 1 only

9

Hydrobiidae (incl. Bithyniidae) \*

Potamopyrgus jenkinsi

4

Planorbidae

Armiger crista 1 only

9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 9

ON NO. OF TAXA 3

1 No representative of family in vial

5 Specimen dead at time of sampling

9 Taxon missed in sorting

2 Alternative terrestrial specimen in vial

6 Taxon in vial but not recorded

10 Unexplained error

3 Posterior end only in vial

7 Mis-identification

11 Taxon added in internal AQC

4 Empty shell or case or cast skin in vial

8 Typographical error - wrong box ticked

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 25.10.95

WATER-  
COURSE: Ore

PRIMARY  
ANALYST: KB

AQC  
ANALYST: HVHT

SITE: Bowhill Bridge

CODE: 1416

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Lochty Burn  
SITE: Ballingry

LABORATORY: Riccarton  
PRIMARY  
ANALYST: KB  
CODE: 1429

DATE: 1.11.95  
AQC  
ANALYST: HVHT  
SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Limnephilidae	Potamophylax cingulatus/latipennis 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 7

ON NO. OF TAXA 1

1 No representative of family in vial  
2 Alternative terrestrial specimen in vial  
3 Posterior end only in vial  
4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling  
6 Taxon in vial but not recorded  
7 Mis-identification  
8 Typographical error - wrong box ticked

9 Taxon missed in sorting  
10 Unexplained error  
11 Taxon added in internal AQC  
12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 7.11.95

WATER-

PRIMARY

AQC

COURSE: Almond

ANALYST: KB

ANALYST: HVHT

SITE: Cowhill

CODE: 1020

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae)	Hydraena gracilis (adult) 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)



## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 22.11.95

WATER-  
COURSE: Crossford Burn

PRIMARY  
ANALYST: KB

AQC  
ANALYST: HVHT

SITE: d/s Milesmark STW

CODE: 6279

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae)	Hydraena riparia (adult) 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 27.9.95

WATER-

PRIMARY

AQC

COURSE: Rashiehill Burn

ANALYST: HVHT

ANALYST: KB

SITE: Greenhill

CODE: 3928

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Tipulidae	Indet Tipulinae (juvenile) 1 only	9
Beraeidae	Beraeodes minutus 1 only	9
Scirtidae	Elodes sp. (larva) 1 only	9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 20

ON NO. OF TAXA 3

1 No representative of family in vial

5 Specimen dead at time of sampling

9 Taxon missed in sorting

2 Alternative terrestrial specimen in vial

6 Taxon in vial but not recorded

10 Unexplained error

3 Posterior end only in vial

7 Mis-identification

11 Taxon added in internal AQC

4 Empty shell or case or cast skin in vial

8 Typographical error - wrong box ticked

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 7.11.95

WATER-  
COURSE: Almond

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: KB

SITE: Fauldhouse Road Bridge

CODE: 433

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 1.11.95

WATER-

PRIMARY

AQC

COURSE: Bog Burn

ANALYST: HVHT

ANALYST: KB

SITE: Whiteside

CODE: 3513

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB  
WATER-  
COURSE: Dollar Burn

LABORATORY: Riccarton  
PRIMARY  
ANALYST: BOK

DATE: 21.11.95  
AQC  
ANALYST: PW  
SORT/AQC  
METHOD: Preserved/Preserved

SITE: u/s R.Devon

CODE: 5610

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Odontoceridae	Odontocerum albicorne 1 only	9
Goeridae	Silo pallipes	9
Planariidae (incl. Dugesiidae)	Polycelis felina	9

### SUMMARY OF AUDIT

LOSSES 0    GAINS 3    OMISSIONS: 0

#### NET EFFECTS:

ON BMWP SCORE 25  
ON NO. OF TAXA 3

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 14.11.95

WATER-

PRIMARY

AQC

COURSE: Water of Leith

ANALYST: SdP

ANALYST: PW

SITE: Currie

CODE: 4180

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

- 1 No representative of family in vial
- 2 Alternative terrestrial specimen in vial
- 3 Posterior end only in vial
- 4 Empty shell or case or cast skin in vial

- 5 Specimen dead at time of sampling
- 6 Taxon in vial but not recorded
- 7 Mis-identification
- 8 Typographical error - wrong box ticked

- 9 Taxon missed in sorting
- 10 Unexplained error
- 11 Taxon added in internal AQC
- 12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 10.10.95

WATER-  
COURSE: Cock Burn

PRIMARY  
ANALYST: SdP

AQC  
ANALYST: PW

SITE: Whelpside

CODE: 4214

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
-------------	-------------------------------------	---

### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Hydropsychidae	Hydropsyche sp. (juvenile) 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 3.10.95

WATER-

PRIMARY

AQC

COURSE: Fullarton Water

ANALYST: SdP

ANALYST: PW

SITE: B6372 Bridge

CODE: 4395

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

Sphaeriidae

1

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Ephemerellidae

Ephemerella ignita 1 only

9

### SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 7

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)



## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 4.10.95

WATER-  
COURSE: South Esk

PRIMARY  
ANALYST: SdP

AQC  
ANALYST: PW

SITE: d/s Moorfoot

CODE: 6163

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Simuliidae

Simulium sp. 1 only

9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 3.10.95

WATER-

PRIMARY

AQC

COURSE: Gore Water

ANALYST: SdP

ANALYST: PW

SITE: u/s Confluence

CODE: 4376

SORT/AQC

METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

### SAMPLE

BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

### SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Forth RPB

LABORATORY: Riccarton

DATE: 27.9.95

WATER-  
COURSE: Garbethill Burn

PRIMARY  
ANALYST: HVHT

AQC  
ANALYST: SdP

SITE: Fannyside Mill Farm

CODE: 2957

SORT/AQC  
METHOD: Preserved/Preserved

### RESULTS OF MAIN AUDIT

Family name	Species name (where appropriate)	Presumed cause of error (see footnotes)
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### VIAL

#### BMWP taxa not found by IFE

None

#### Additional BMWP taxa found by IFE

None

### SAMPLE

#### BMWP taxa not found by IFE (For samples where vial is broken or absent)

N/a

#### Additional BMWP taxa found by IFE

Goeridae	Goera pilosa 1 only	9
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### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 10  
ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

Omission (\*) = Recorded, not in vial but found by IFE in sample ( no net loss or gain)