



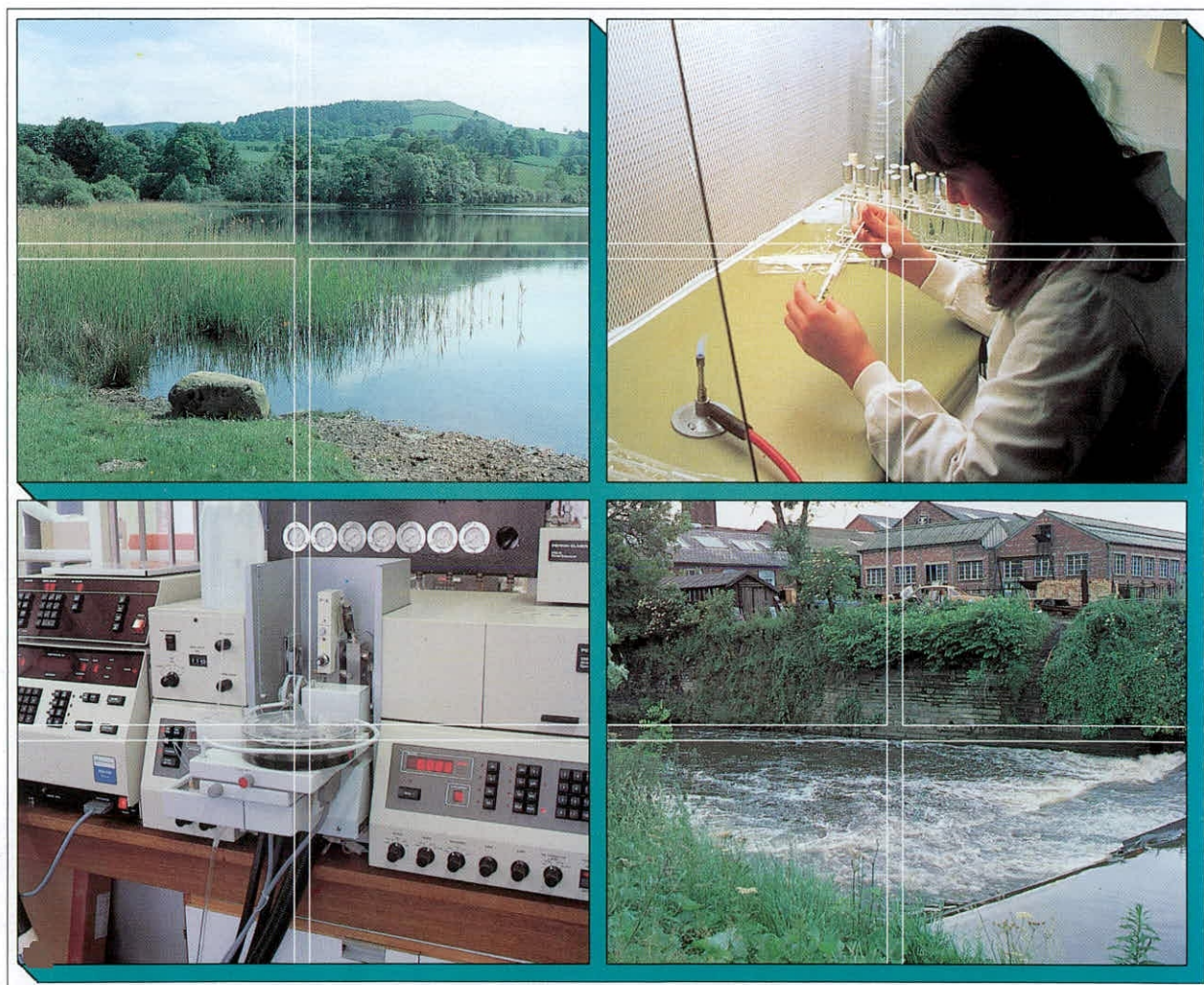
# **An audit of performance in the analysis of biological samples in 1996 IRTU, Northern Ireland**

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Report To:

Industrial Research & Technology Unit, Northern Ireland







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## **1. INTRODUCTION**

In 1996 the sampling of aquatic macro-invertebrates for the biological assessment of river quality was carried out throughout the United Kingdom. This task was undertaken by the Environment Agency (EA) in England and Wales, the Scottish Environment Protection Agency (SEPA) in Scotland and the Industrial Research and Technology Unit (IRTU) undertook the work in Northern Ireland.

Each organisation employed standard collection procedures as used in the 1995 General Quality Assessment (GQA) Survey. The sampling strategy was therefore 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 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 EA and SEPA region and for IRTU. This commission was consistent with the audit performed by IFE for the National River Quality Surveys in 1990 and 1995 and for the routine biological monitoring of river sites each year between 1991 and 1994. The audit for the EA comprised two elements. The AQC audit provided a measure of the quality of performance of the AQC analysts. The Primary Audit provided an independent assessment of the quality of the data, since this was not adjusted for errors identified by either of the other quality assurance procedures

This report presents the results of the audit of 62 samples analysed by IRTU staff

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

- i) a 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 (see Appendix) and sent to the Quality Control Manager. 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". This section also includes taxa added by the internal AQC analyst. 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 or the wrong family box being ticked on the data sheet.

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 IRTU are summarised by season in Tables 1 to 3. Table 4 displays the statistics of these 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 laboratory as a whole. Table 5 presents data for IRTU 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 6 lists, at family level, the taxa missed in sorting by IRTU's analysts in the 1996 audit. Table 7 lists the species most frequently missed by IRTU's biologists, as found by the 1996 audit. Tables 8 and 9 give a listing of all missed taxa at family and species level for the entire 1996 audit for the whole of the UK (Primary and AQC Audits for EA regions plus single Audit for other organisations

## **6. ACKNOWLEDGEMENTS**

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



Table 1 The 20 spring samples audited for IRTU

River	Site	AQC Analyst	Losses	Gains	Omissions
Kilroot	Kilroot	CAK	2	1	0
Cassy Water	Cassy Water Bridge	CAK	0	1	0
White Water	White Water Bridge	CAK	1	2	0
Ghann	Green Park Bridge	CAK	1	1	0
Glenlark	Glenlark Bridge	IO'N	0	0	0
Glenshesk	B15 Bridge	IO'N	0	1	0
Lough-A-Hache	d/s Moorlough Lake	IO'N	0	1	0
Glenmornan	Catherines Bridge	IO'N/PRH	0	2	0
Creevan Burn	Creevan Cottage	MJO	0	1	0
Dennet	Burn Dennet	MJO	1	3	0
Bush	Conagher Bridge	MJO	0	1	0
Burndennet	Dunnamanagh	MJO/PRH	0	0	0
Glynn	Glynn	MK	0	1	0
Kilbroney	Newtown Bridge	MK	0	0	0
Kilkeel	Kilkeel A2 Bridge	MK	0	3	0
Owenreagh	Ballynahatty Bridge	MK	0	1	0
Killyclougher Burn	Lovers Retreat	PRH	0	2	0
Owenkillew	Monanameal Bridge	PRH	1	1	0
Colebrooke	Tullyreagh Bridge	PRH	0	1	0
Arney	Drumane Bridge	PRH	0	2	0

Table 2 The 22 summer samples audited for IRTU

River	Site	AQC Analyst	Losses	Gains	Omissions
Torrent	Newmills Bridge	CAK	0	2	0
Ballinderry	Kings Bridge	CAK	0	1	1
Blackwater (ARDS)	Ballymartin Road	CAK	0	0	0
Carey	Careymill Bridge	CAK	0	0	0
Dervock	Iderown Bridge	CC	0	0	0
Glenarm	Glenarm	CC	2	0	0
Derg	Millbrook New Bridge	CC	2	4	2
Killen Burn	Glashagh	IO'N	0	2	1
Derg	Aghyaran Bridge	IO'N	0	1	0
Derg	Crewe Bridge	IO'N	0	0	1
Termon	Killynoogan	IO'N	0	1	0
Bush	Ballyhoe Bridge	MJO	0	0	1
Aghadowey	Whites Bridge	MJO	1	1	0
Aghivey	Moneycarrie Bridge	MJO	0	2	0
Newry Canal	Carnmeen	MK	0	2	1
Ballinderry	Ballinderry Bridge	MK	0	4	1
Ballinderry	Corkhill Bridge	MK	0	3	0
Glenariff	Callisnagh Bridge	MK	0	2	2
Larne	Owens Bridge	PRH	0	3	0
Creevan Burn	Creevan Cottage	PRH	0	0	0
Macosquin River	Ree Bridge	PRH	0	1	0
Lackey	Knockballymore	PRH	1	4	0

Table 3            The 20 autumn samples audited for IRTU

River	Site	AQC Analyst	Losses	Gains	Omissions
Quiggery	Edergoole Bridge	CAK	0	3	0
Cloughfin	Blackhill	CAK	0	2	0
Strule	Stone Bridge	CAK	0	2	0
Mourne	Victoria Bridge	CAK	0	3	0
Killyclougher Burn	Killyclougher	CC	0	1	0
Owenreagh	Cashel Bridge	CC	0	1	0
Glenelly	Clogherny	CC	2	3	0
Glenelly	Corrick Bridge	CC	0	0	0
Moneycarragh	Moneylane	IO'N	0	1	0
Ardilea	A2 Bridge	IO'N	0	3	0
Owenkillew	Killymore Bridge	IO'N	1	0	0
Cappagh Burn	Tattynure Bridge	IO'N	0	0	0
Annacloy	Annacloy Bridge	MB	1	1	0
Glynn	Glynn	MB	1	2	0
Camowen	Granny Bridge	MB	0	1	0
Strule	Abercorn	MB	0	0	0
Ballygawley Water	Lismore Bridge	PRH	1	0	0
Creevan Burn	Creevan Cottage	PRH	1	0	1
Curly	Artikelly	PRH	0	2	0
Braid	Knockan Bridge	PRH/IO'N	1	2	0

Table 4. Statistics of the 1996 audit results for IRTU

Analyst/Group	n	Mean gains	Standard error	No.samples >2 gains	% samples >2 gains	Highest no. gains	Mean errors (l+g+o)	Standard error
CAK	12	2	0.29	2	16.67	3	1.92	0.31
CC	7	1	0.61	2	28.57	4	2.43	1.13
IO'N	12	1	0.28	1	8.33	3	1.25	0.28
MB	4	1	0.41	0	0.00	2	1.50	0.65
MJO	7	1	0.40	1	14.29	3	1.57	0.48
MK	8	2	0.46	3	37.50	4	2.50	0.60
PRH	12	2	0.36	2	16.67	4	2.00	0.37
<b>IRTU</b>	<b>62</b>	<b>1.37</b>	<b>0.15</b>	<b>11</b>	<b>17.74</b>	<b>4</b>	<b>1.87</b>	<b>0.19</b>

Table 5 Net effects of the Audit on BMWP score and number of scoring taxa for IRTU

Analyst/Group	n	Mean net effect on BMWP score	%samples underestimated by score >13	Maximum underestimate of BMWP score	Mean net effect on no. of taxa	% of samples underestimated by >2 taxa	Maximum underestimate of no. of taxa
CAK	12	7.50	16.67	20	1.17	16.67	3
CC	7	5.29	28.57	17	0.43	0.00	2
IO'N	12	4.08	8.33	15	0.92	8.33	3
MB	4	-0.50	0.00	5	0.50	0.00	1
MJO	7	4.43	14.29	15	0.86	0.00	2
MK	8	10.88	25.00	30	2.00	37.50	4
PRH	12	6.08	16.67	20	1.08	16.67	3
<b>IRTU</b>	<b>62</b>	<b>5.89</b>	<b>16.13</b>	<b>30</b>	<b>1.05</b>	<b>12.90</b>	<b>4</b>

Table 6            The families missed by IRTU's analysts in the 1996 audit

Family	n	% of Ireland Region's missed species in 1996 Audit
Hydrophilidae (incl. Hydraenidae)	9	12.16
Tipulidae	5	6.76
Sphaeriidae	5	6.76
Hydroptilidae	4	5.41
Psychomyiidae (incl. Ecnomidae)	4	5.41
Planorbidae	4	5.41
Glossiphoniidae	3	4.05
Goeridae	3	4.05
Haliplidae	3	4.05
Hydrobiidae (incl. Bithyniidae)	3	4.05
Lepidostomatidae	3	4.05
Lymnaeidae	3	4.05
Sericostomatidae	3	4.05
Hydropsychidae	3	4.05
Valvatidae	2	2.70
Physidae	2	2.70
Caenidae	1	1.35
Chloroperlidae	1	1.35
Elmidae	1	1.35
Ephemerellidae	1	1.35
Erpobdellidae	1	1.35
Taeniopterygidae	1	1.35
Rhyacophilidae (incl. Glossosomatidae)	1	1.35
Nemouridae	1	1.35
Heptageniidae	1	1.35
Polycentropodidae	1	1.35
Piscicolidae	1	1.35
Asellidae	1	1.35
Leptoceridae	1	1.35
Limnephilidae	1	1.35
Gyrinidae	1	1.35
<b>TOTAL</b>	<b>74</b>	<b>100.00</b>

Table 7 The species missed by IRTU's analysts in the 1996 audit

Species	n	% of Ireland's missed taxa in Audit
Hydraena gracilis Germar	7	8.64
Pisidium sp.	4	4.94
Psychomyia pusilla (Fabricius)	4	4.94
Dicranota sp.	3	3.70
Helophorus (Atracthelophorus) brevipalpis Bedel	3	3.70
Hydroptila sp.	3	3.70
Lepidostoma hirtum (Fabricius)	3	3.70
Potamopyrgus jenkinsi (Smith)	3	3.70
Sericostoma personatum (Spence)	3	3.70
Helobdella stagnalis (L.)	2	2.47
Goera pilosa (Fabricius)	2	2.47
Bathyomphalus contortus (L.)	2	2.47
Valvata piscinalis (Muller)	2	2.47
Hydropsyche sp.	2	2.47
Glossiphonia complanata (L.)	2	2.47
Ecdyonurus sp.	1	1.23
Gyraulus albus (Muller)	1	1.23
Erpobdellidae indet	1	1.23
Gyraulus albus (Muller)	1	1.23
Elmis aenea (Muller)	1	1.23
Haliphus lineatocollis (Marsham)	1	1.23
Valvata cristata Muller	1	1.23
Chloroperla torrentium (Pictet)	1	1.23
Caenis luctuosa/macrura	1	1.23
Brychius elevatus (Panzer)	1	1.23
Brachyptera risi (Morton)	1	1.23
Asellus aquaticus (L.)	1	1.23
Antocha vitripennis (Meigen)	1	1.23
Anacaena limbata (Fabricius)	1	1.23
Anacaena globulus (Paykull)	1	1.23
Ephemerella ignita (Poda)	1	1.23
Lymnaea sp.	1	1.23
Plectrocnemia sp.	1	1.23
Piscicola geometra (L.)	1	1.23
Physa sp.	1	1.23
Physa fontinalis (L.)	1	1.23
Orectochilus villosus (Muller)	1	1.23
Nemoura avicularis Morton	1	1.23
Halesus radiatus (Curtis)	1	1.23
Molophilus sp.	1	1.23
Hydropsyche siltalai Dohler	1	1.23
Lymnaea peregra (Muller)	1	1.23
Lymnaea palustris/truncatula	1	1.23
Limnius volckmari (Panzer)	1	1.23
Silo pallipes (Fabricius)	1	1.23
Ithytrichia sp.	1	1.23
Sphaeriidae indet	1	1.23
Tipula sp.	1	1.23
Agapetus sp.	1	1.23
Haliphus fluviatilis Aube	1	1.23
Mystacides azurea (L.)	1	1.23
<b>TOTAL</b>	<b>81</b>	<b>100.00</b>

Table 8 Missed families for all samples in the 1996 audit

Family	n	% of missed taxa in 1996 audit
Hydroptilidae	78	5.41
Elmidae	74	5.13
Hydrophilidae (incl. Hydraenidae)	73	5.06
Hydrobiidae (incl. Bithyniidae)	59	4.09
Simuliidae	57	3.95
Planariidae (incl. Dugesiidae)	49	3.40
Psychomyiidae (incl. Ecnomidae)	49	3.40
Caenidae	43	2.98
Tipulidae	41	2.84
Leptoceridae	41	2.84
Sphaeriidae	40	2.77
Halplidae	36	2.50
Lymnaeidae	36	2.50
Planorbidae	35	2.43
Valvatidae	32	2.22
Goeridae	32	2.22
Hydropsychidae	31	2.15
Polycentropodidae	30	2.08
Ancylidae (incl. Acroloxidae)	29	2.01
Glossiphoniidae	29	2.01
Asellidae	29	2.01
Rhyacophilidae (incl. Glossosomatidae)	28	1.94
Physidae	26	1.80
Lepidostomatidae	26	1.80
Limnephilidae	26	1.80
Baetidae	26	1.80
Dytiscidae (incl. Noteridae)	25	1.73
Dendrocoelidae	24	1.66
Sericostomatidae	24	1.66
Nemouridae	22	1.53
Leptophlebiidae	22	1.53
Erpobdellidae	18	1.25
Scirtidae	17	1.18
Coenagriidae	16	1.11
Chloroperlidae	16	1.11
Leuctridae	16	1.11
Ephemerellidae	15	1.04
Heptageniidae	14	0.97
Gyrinidae	14	0.97
Chironomidae	14	0.97
Brachycentridae	11	0.76
Odontoceridae	10	0.69
Perlodidae	10	0.69
Oligochaeta	10	0.69
Taeniopterygidae	10	0.69
Piscicolidae	9	0.62
Sialidae	8	0.55
Calopterygidae	6	0.42
Beraeidae	5	0.35
Corophiidae	5	0.35

Table 8 continued

Family	n	% of missed taxa in 1996 audit
Corixidae	5	0.35
Hydrometridae	4	0.28
Ephemeridae	4	0.28
Gammaridae (incl. Crangonyctidae)	4	0.28
Notonectidae	3	0.21
Molannidae	3	0.21
Dryopidae	3	0.21
Hirudinidae	2	0.14
Phryganeidae	2	0.14
Aphelocheiridae	2	0.14
Perlidae	2	0.14
Unionidae	2	0.14
Philopotamidae	2	0.14
Nepidae	2	0.14
Capniidae	1	0.07
Cordulegasteridae	1	0.07
Gerridae	1	0.07
Gomphidae	1	0.07
Neritidae	1	0.07
Siphonuridae	1	0.07
<b>TOTAL</b>	<b>1442</b>	<b>100.00</b>

Table 9 Missed species for all samples in the 1996 audit

Species	n	% of missed species in 1996 audit
Potamopyrgus jenkinsi (Smith)	58	3.84
Hydroptila sp.	58	3.84
Elmis aenea (Muller)	51	3.38
Hydraena gracilis Germar	38	2.52
Simulium (Simulium) ornatum group	33	2.19
Pisidium sp.	32	2.12
Ancylus fluviatilis Muller	28	1.86
Dendrocoelum lacteum (Muller)	24	1.59
Sericostoma personatum (Spence)	24	1.59
Haliphus sp.	24	1.59
Tinodes waeneri (L.)	24	1.59
Caenis rivulorum Eaton	24	1.59
Asellus aquaticus (L.)	23	1.52
Lepidostoma hirtum (Fabricius)	22	1.46
Valvata piscinalis (Muller)	21	1.39
Lymnaea peregra (Muller)	19	1.26
Polycelis nigra/tenuis	19	1.26
Oulimnius sp.	18	1.19
Caenis luctuosa/macrura	17	1.13
Gyraulus albus (Muller)	17	1.13
Dicranota sp.	16	1.06
Elodes sp.	16	1.06
Chloroperla torrentium (Pictet)	16	1.06
Ephemerella ignita (Poda)	15	0.99
Helobdella stagnalis (L.)	15	0.99
Valvata cristata Muller	14	0.93
Psychomyia pusilla (Fabricius)	14	0.93
Orectochilus villosus (Muller)	13	0.86
Rhyacophila dorsalis (Curtis)	13	0.86
Mystacides azurea (L.)	13	0.86
Hydropsyche siltalai Dohler	13	0.86
Baetis rhodani (Pictet)	13	0.86
Helophorus (Atracthelophorus) brevipalpis Bedel	13	0.86
Orthocladiinae	12	0.80
Leuctra fusca (L.)	12	0.80
Polycentropus flavomaculatus (Pictet)	12	0.80
Physa fontinalis (L.)	12	0.80
Simulium (Eusimulium) aureum group	12	0.80
Hydropsyche sp.	12	0.80
Lymnaea sp.	11	0.73
Polycelis felina (Dalyell)	11	0.73
Brachycentrus subnubilus Curtis	11	0.73
Silo pallipes (Fabricius)	11	0.73
Ithytrichia sp.	11	0.73
Ecdyonurus sp.	10	0.66
Ischnura elegans (Van der Linden)	10	0.66
Glossiphonia complanata (L.)	10	0.66
Odontocerum albicorne (Scopoli)	10	0.66
Pilaria (Pilaria) sp.	10	0.66
Habrophlebia fusca (Curtis)	10	0.66



Table 9 continued

Species	n	% of missed species in 1996 audit
Silo sp.	10	0.66
Piscicola geometra (L.)	9	0.60
Agapetus sp.	9	0.60
Oreodytes sanmarkii (Sahlberg)	9	0.60
Lype sp.	8	0.53
Athripsodes bilineatus (L.)	8	0.53
Limnephilidae indet	8	0.53
Oxyethira sp.	8	0.53
Armiger crista (L.)	8	0.53
Erpobdellidae indet	8	0.53
Oulimnius tuberculatus (Muller)	7	0.46
Paraleptophlebia submarginata (Stephens)	7	0.46
Physa sp.	7	0.46
Physa acuta/heterostropha	7	0.46
Erpobdella octoculata (L.)	7	0.46
Goera pilosa (Fabricius)	7	0.46
Limnius volckmari (Panzer)	7	0.46
Sphaeriidae indet	7	0.46
Nemoura avicularis Morton	6	0.40
Asellus meridianus Racovitza	6	0.40
Isoperla grammatica (Poda)	6	0.40
Coenagriidae indet	6	0.40
Dugesia tigrina (Girard)	6	0.40
Tubificidae	6	0.40
Plectrocnemia conspersa (Curtis)	6	0.40
Baetis vernus Curtis	5	0.33
Taeniopteryx nebulosa (L.)	5	0.33
Athripsodes sp.	5	0.33
Protonemura meyeri (Pictet)	5	0.33
Bathyomphalus contortus (L.)	5	0.33
Tipula (Yamatotipula) montium group	5	0.33
Brachyptera risi (Morton)	5	0.33
Athripsodes aterrimus (Stephens)	5	0.33
Plectrocnemia sp.	5	0.33
Anisus vortex (L.)	5	0.33
Dugesia lugubris/polychroa	4	0.27
Planariidae indet	4	0.27
Sialis fuliginosa Pictet	4	0.27
Simulium (Boophthora) erythrocephalum (deGeer)	4	0.27
Ephemera sp.	4	0.27
Crunoecia irrorata (Curtis)	4	0.27
Haliphus lineatocollis (Marshall)	4	0.27
Hydraena riparia Kugelann	4	0.27
Glossosoma sp.	4	0.27
Leuctra inermis Kempny	4	0.27
Hydropsyche angustipennis (Curtis)	4	0.27
Perlodes microcephala (Pictet)	4	0.27
Nemurella picteti Klapalek	4	0.27
Tanytarsini	4	0.27
Glossiphonia heteroclita (L.)	4	0.27

Table 9 continued

Species	n	% of missed species in 1996 audit
<i>Haliphus fluviatilis</i> Aube	4	0.27
<i>Gammarus pulex</i> (L.)	4	0.27
<i>Agraylea multipunctata</i> Curtis	4	0.27
<i>Agabus</i> sp./ <i>Ilybius</i> sp.	4	0.27
<i>Adicella reducta</i> (McIachlan)	3	0.20
<i>Halesus digitatus/radiatus</i>	3	0.20
<i>Simulium</i> (Nevermannia) <i>cryophilum</i> group	3	0.20
<i>Antocha vitripennis</i> (Meigen)	3	0.20
<i>Heptagenia sulphurea</i> (Muller)	3	0.20
<i>Hydrometra</i> sp.	3	0.20
<i>Simulium</i> (Nevermannia) <i>angustitarse</i> group	3	0.20
<i>Molanna angustata</i> Curtis	3	0.20
<i>Platambus maculatus</i> (L.)	3	0.20
<i>Beraea maurus</i> (Curtis)	3	0.20
<i>Calopteryx</i> sp.	3	0.20
<i>Polycentropus</i> sp.	3	0.20
<i>Calopteryx splendens</i> (Harris)	3	0.20
<i>Notonecta</i> sp.	3	0.20
<i>Chironomini</i>	3	0.20
<i>Limnebius truncatellus</i> (Thunberg)	3	0.20
<i>Corophium curvispinum</i> Sars	3	0.20
<i>Paraleptophlebia</i> sp.	3	0.20
<i>Protonemura</i> sp.	3	0.20
<i>Athripsodes cinereus</i> (Curtis)	3	0.20
<i>Dugesia polychroa/lugubris</i>	3	0.20
<i>Dryops</i> sp.	3	0.20
<i>Drusus annulatus</i> / <i>Ecclisopteryx guttulata</i>	3	0.20
<i>Cloeon dipterum</i> (L.)	3	0.20
<i>Rhyacophila</i> sp.	3	0.20
<i>Limnephilus</i> sp.	3	0.20
<i>Sialis lutaria</i> (L.)	3	0.20
<i>Ecclisopteryx guttulata</i> (Pictet)	2	0.13
<i>Haemopsis sanguisuga</i> (L.)	2	0.13
<i>Brychius elevatus</i> (Panzer)	2	0.13
<i>Adicella/Triaenodes</i> group	2	0.13
Goeridae indet	2	0.13
<i>Beraeodes minutus</i> (L.)	2	0.13
<i>Caenis horaria</i> (L.)	2	0.13
<i>Agabus</i> sp.	2	0.13
<i>Baetis scambus</i> group	2	0.13
<i>Anacaena globulus</i> (Paykull)	2	0.13
<i>Baetis buceratus</i> Eaton	2	0.13
<i>Aphelocheirus aestivalis</i> (Fabricius)	2	0.13
<i>Corophium multisetosum</i> Stock	2	0.13
<i>Austrolimnophila</i> sp.	2	0.13
<i>Erioptera</i> sp.	2	0.13
<i>Amphinemura sulcicollis</i> (Stephens)	2	0.13
<i>Cyrrnus trimaculatus</i> (Curtis)	2	0.13
Enchytraeidae	2	0.13
<i>Anabolia nervosa</i> (Curtis)	2	0.13

Table 9 continued

Species	n	% of missed species in 1996 audit
Glossiphoniidae indet	2	0.13
Lymnaca stagnalis (L.)	2	0.13
Ilybius sp.	2	0.13
Laccobius sp.	2	0.13
Leptophlebiidae indet	2	0.13
Limnephilus extricatus Mclachlan	2	0.13
Limnophila (Eloeophila) sp.	2	0.13
Silo nigricornis (Pictet)	2	0.13
Hydropsyche contubernalis Mclachlan	2	0.13
Pilaria sp.	2	0.13
Lumbriculidae	2	0.13
Lymnaea truncatula (Muller)	2	0.13
Mystacides nigra/longicornis	2	0.13
Nemoura cambrica/erratica	2	0.13
Nemoura sp.	2	0.13
Nepa cinerea L.	2	0.13
Haliplidae indet	2	0.13
Potamonectes sp.	2	0.13
Oulimnius major (Rey)	2	0.13
Phryganeidae indet	2	0.13
Sigara (Subsigara) falleni (Fieber)	2	0.13
Simulium argyreatum/variegatum	2	0.13
Sigara (Sigara) dorsalis (Leach)	2	0.13
Hydrophilidae indet	2	0.13
Helophorus flavipes/obscurus	2	0.13
Helophorus sp.	2	0.13
Tanypodinae	2	0.13
Tinodes waeneri (L.), Lype sp.	2	0.13
Hydraena riparia	2	0.13
Simulium (Simulium) reptans (L.)	2	0.13
Trocheta sp.	2	0.13
Hydrobius fuscipes (L.)	2	0.13
Helophorus (Helophorus) flavipes/obscurus	2	0.13
Polycentropus flavomaculatus/kingi	1	0.07
Bithynia tentaculata (L.)	1	0.07
Ameletus inopinatus Eaton	1	0.07
Sphaerium sp.	1	0.07
Baetis scambus/fuscatus	1	0.07
Potamophylax cingulatus/latipennis	1	0.07
Theodoxus fluviatilis (L.)	1	0.07
Prodiamesinae	1	0.07
Athripsodes commutatus (Rostock)	1	0.07
Baetis sp.	1	0.07
Tipula sp.	1	0.07
Potamonectes depressus/elegans	1	0.07
Polycelis sp.	1	0.07
Cercyon sp.	1	0.07
Anodonta sp.	1	0.07
Simulium (Wilhelmia) equinum (L.)	1	0.07
Anacaena limbata (Fabricius)	1	0.07

Table 9 continued

Species	n	% of missed species in 1996 audit
Simulium (Simulium) argyreatum Meigen	1	0.07
Simulium (Nevermannia) vernum Macquart	1	0.07
Pseudanodonta complanata (Rossmassler)	1	0.07
Anacaena bipustulata (Marsham)	1	0.07
Prosimulium hirtipes/tomosvaryi	1	0.07
Simulium sp.	1	0.07
Athripsodes albifrons (L.)	1	0.07
Athripsodes albifrons/bilineatus	1	0.07
Sialis sp.	1	0.07
Riolus subviolaceus (Muller)	1	0.07
Rhithrogena sp.	1	0.07
Psychomyiidae indet	1	0.07
Simulium (Wilhelmia) sp.	1	0.07
Hippeutis complanatus (L.)	1	0.07
Lumbricidae	1	0.07
Capnia sp.	1	0.07
Leptophlebia marginata (L.)	1	0.07
Wormaldia occipitalis (Pictet)	1	0.07
Acroloxus lacustris (L.)	1	0.07
Hydrometra stagnorum (L.)	1	0.07
Planorbidae indet	1	0.07
Gerris (Gerris) lacustris (L.)	1	0.07
Drusus annulatus (Stephens)	1	0.07
Heptagenia lateralis (Curtis)	1	0.07
Heptagenia lateralis (Curtis)	1	0.07
Gomphus vulgatissimus (L.)	1	0.07
Helophorus (Meghelophorus) grandis Illiger	1	0.07
Gyraulus albus (Muller)	1	0.07
Gyrinus sp.	1	0.07
Helophorus (Meghelophorus) aequalis Thomson	1	0.07
Helophorus (Helophorus) minutus Fabricius	1	0.07
Halesus radiatus (Curtis)	1	0.07
Hydrocyphon deflexicollis (Muller)	1	0.07
Colymbetinae indet	1	0.07
Pilaria (Neolimnomyia) sp.	1	0.07
Caenis luctuosa group	1	0.07
Philopotamus montanus (Donovan)	1	0.07
Perla bipunctata Pictet	1	0.07
Oreodytes davisii (Curtis)	1	0.07
Hydroporus tessellatus Drapiez	1	0.07
Limnephilidae	1	0.07
Chloroperla tripunctata (Scopoli)	1	0.07
Dinocras cephalotes (Curtis)	1	0.07
Cordulegaster boltonii (Donovan)	1	0.07
Molophilus sp.	1	0.07
Micronecta sp.	1	0.07
Crenobia alpina/Phagocata vitta	1	0.07
Cyrnus flavidus Mclachlan	1	0.07
Lymnaea palustris/truncatula	1	0.07
Dicranota (Dicranota) sp.	1	0.07

Table 9 continued

Species	n	% of missed species in 1996 audit
<i>Lymnaea palustris</i> (Muller)	1	0.07
<i>Dina lineata</i> (Muller)	1	0.07
<i>Ceraclea</i> sp.	1	0.07
<b>TOTAL</b>	<b>1509</b>	<b>100.00</b>



## **APPENDIX**

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

## EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 27.3.96

WATER-  
COURSE: Kilroot

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Kilroot

CODE: 110216

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Corixidae	5
Polycentropodidae	7
Rhyacophila sp. (juv)	

#### Additional BMWP taxa found by IFE

Rhyacophilidae (incl. Glossosomatidae)	7
Rhyacophila sp. (juv)	

### 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 2

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.4.96

WATER-  
COURSE: Cassy Water

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Cassy Water Bridge

CODE: 110221

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Gyrinidae

9

Orectochilus villosus (Muller) (l) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.4.96

WATER-  
COURSE: White Water

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: White Water Bridge

CODE: 110222

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Capniidae 7

Brachyptera risi

#### Additional BMWP taxa found by IFE

Taeniopterygidae 7

Brachyptera risi (Morton)

### SAMPLE

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

N/a

#### Additional BMWP taxa found by IFE

Goeridae 9

Silo pallipes (Fabricius) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 2

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.4.96

WATER-  
COURSE: Ghann

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Green Park Bridge

CODE: 110220

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Rhyacophilidae (incl. Glossosomatidae)

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

Lepidostomatidae

9

Lepidostoma hirtum (Fabricius) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 3

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 29.4.96

WATER-  
COURSE: Glenlark

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Glenlark Bridge

CODE: 110204

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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: N.Ireland  
WATER-  
COURSE: Glenshesk

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: IO'N

DATE: 7.5.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

SITE: B15 Bridge

CODE: 110193

### RESULTS OF AUDIT

Family name	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)

9

Anacaena globulus (Paykull) (a) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 9.5.96

WATER-  
COURSE: Lough-A-Hache

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: d/s Moirlough Lake

CODE: 110277

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

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Family name	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

Physidae

9

Physa sp. (no shell) 1 only

---

### 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: N.Ireland  
WATER-  
COURSE: Glenmornan

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: IO'N

DATE: 7.5.96  
AQC  
ANALYST: PRH  
SORT/AQC  
METHOD: Live

SITE: Catherines Bridge

CODE: 110292

### RESULTS OF AUDIT

Family name	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

Lymnaeidae	9
Lymnaea palustris/truncatula 1 only	
Sphaeriidae	9
Indet juvenile 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 6

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.5.96

WATER-  
COURSE: Creevan Burn

PRIMARY  
ANALYST: MJO

AQC  
ANALYST:

SITE: Creevan Cottage

CODE: 110293

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Psychomyiidae (incl. Ecnomidae)

Psychomyia pusilla (Fabricius)

9

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 8

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 7.5.96

WATER-  
COURSE: Dennet

PRIMARY  
ANALYST: MJO

AQC  
ANALYST:

SITE: Burn Dennet

CODE: 110002

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Ephemeroidea	8
Ephemeroidea ignita	

#### Additional BMWP taxa found by IFE

Ephemeroidea	8
Ephemeroidea ignita (Poda)	

### SAMPLE

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

N/a

#### Additional BMWP taxa found by IFE

Sericostomatidae	9
Sericostoma personatum (Spence)	
Tipulidae	9
Antocha vitripennis (Meigen)	
Dicranota sp.	

### SUMMARY OF AUDIT

LOSSES 1

GAINS 3

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 9.5.96

WATER-  
COURSE: Bush

PRIMARY  
ANALYST: MJO

AQC  
ANALYST:

SITE: Conagher Bridge

CODE: 110091

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

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Family name	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

Planorbidae

9

Bathyomphalus contortus (L.) 1 only

---

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 7.5.96

WATER-  
COURSE: Burndennet

PRIMARY  
ANALYST: MJO

AQC  
ANALYST: PRH

SITE: Dunnamanagh

CODE: 110198

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 27.3.96

WATER-  
COURSE: Glynn

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Glynn

CODE: 110217

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

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Family name	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

9

Dicranota sp. 1 only

---

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.4.96

WATER-  
COURSE: Kilbroney

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Newtown Bridge

CODE: 110121

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

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Family name	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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.4.96

WATER-  
COURSE: Kilkeel

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Kilkeel A2 Bridge

CODE: 110233

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Taeniopterygidae	9
Brachyptera risi (Morton) 1 only	
Haliplidae	9
Halplus lineatocollis (Marshall) (a) 1 only	
Hydrophilidae (incl. Hydraenidae)	9
Hydraena gracilis Germar (a) 1 only	

### 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
- 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 1.5.96

WATER-  
COURSE: Owenreagh

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Ballynahatty Bridge

CODE: 110017

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Planorbidae

9

Gyraulus albus (Muller) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 29.4.96

WATER-  
COURSE: Killyclougher Burn

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Lovers Retreat

CODE: 110200

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Elmidae	9
Limnius volckmari (Panzer) (a)	
Elmis aenea (Muller) (a+l)	
Tipulidae	9
Molophilus sp. 1 only	

### SUMMARY OF AUDIT

LOSSES 0    GAINS 2    OMISSIONS: 0

#### NET EFFECTS:

ON BMWP SCORE 10  
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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 29.4.96

WATER-  
COURSE: Owenkillew

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Monanameal Bridge

CODE: 110255

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Unionidae

1

Note on data sheet "Noted on site"

#### 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

Lepidostomatidae

9

Lepidostoma hirtum (Fabricius) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 4

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 9.5.96

WATER-  
COURSE: Colebrooke

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Tullyreagh Bridge

CODE: 110149

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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)

9

Hydraena gracilis Germar (a) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 19.5.96

WATER-  
COURSE: Arney

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Drumane Bridge

CODE: 110132

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Hydrobiidae (incl. Bithyniidae)	9
Potamopyrgus jenkinsi (Smith) 1 only	
Rhyacophilidae (incl. Glossosomatidae)	9
Agapetus sp.	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 10

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 26.6.96

WATER-  
COURSE: Torrent

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Newmills Bridge

CODE: 11 0053

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Hydrobiidae (incl. Bithyniidae) 9

Potamopyrgus jenkinsi (Smith)

Halplidae 9

Brychius elevatus (Panzer) (l) 1 only

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 8

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: N.Ireland  
WATER-  
COURSE: Ballinderry

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: CAK

DATE: 1.7.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

SITE: Kings Bridge

CODE: 11 0075

### RESULTS OF AUDIT

Family name	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) \*

1

Helophorus (Atracthelophorus) brevipalpis Bedel (a)

Hydraena gracilis Germar (a)

Psychomyiidae (incl. Ecnomidae)

9

Psychomyia pusilla (Fabricius) 1 only

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 8

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 3.7.96

WATER-  
COURSE: Blackwater (ARDS)

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Ballymartin Road

CODE: 11 0113

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

---

Family name	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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 22.7.96

WATER-  
COURSE: Carey

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Careymill Bridge

CODE: 11 0192

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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: N.Ireland

LABORATORY: IRTU, Lishburn

DATE: 18.7.96

WATER-  
COURSE: Dervock

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Iderown Bridge

CODE: 11 0093

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 22.7.96

WATER-  
COURSE: Glenarm

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Glenarm

CODE: 11 0195

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Lymnaeidae	1
Limnephilidae	7
Hydropsyche siltalai Dobler (p)	

#### 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 2

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -10

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 24.7.96

WATER-  
COURSE: Derg

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Millbrook New Bridge

CODE: 11 0004

SORT/AQC  
METHOD: Live

## RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Planorbidae	2
Tipulidae	7
Empididae (Wiedemannia group)	
Simuliidae *	1
Simulium (Eusimulium) aureum group (p) 1 only	
Chironomidae *	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

Sphaeriidae	9
Pisidium sp. 1 only	
Hydroptilidae	9
Hydroptila sp. 1 only	
Hydropsychidae	9
Hydropsyche sp. (p)	
Psychomyiidae (incl. Ecnomidae)	9
Psychomyia pusilla (Fabricius) (p) 1 only	
Simuliidae *	1
Simulium (Eusimulium) aureum group (p)	
Chironomidae *	1
Diamesinae	
Orthocladiinae	
Tanytarsini	

## SUMMARY OF AUDIT

LOSSES 2

GAINS 4

OMISSIONS: 2

NET EFFECTS:

ON BMWP SCORE 14

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: N.Ireland  
WATER-  
COURSE: Killen Burn  
SITE: Glashagh

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: IO'N  
CODE: 11 0203

DATE: 24.7.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Gammaridae (incl. Crangonyctidae) \* 1

#### Additional BMWP taxa found by IFE

Dytiscidae (incl. Noteridae) 6

Potamonectes sp. (I)

### SAMPLE

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

N/a

#### Additional BMWP taxa found by IFE

Sphaeriidae 9

Pisidium sp.

Gammaridae (incl. Crangonyctidae) \* 1

Gammarus duebeni Liljeborg

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 8

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 24.7.96

WATER-  
COURSE: Derg

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Aghyaran Bridge

CODE: 11 0005

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

9

Dicranota sp. 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 24.7.96

WATER-

PRIMARY

AQC

COURSE: Derg

ANALYST: IO'N

ANALYST:

SITE: Crewe Bridge

CODE: 11 0179

SORT/AQC

METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Polycentropodidae \*

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

Polycentropodidae \*

1

Polycentropus flavomaculatus (Pictet) 1 only

### 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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 9.8.96

WATER-  
COURSE: Termon

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Killynoogan

CODE: 11 0128

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Goeridae

9

Goera pilosa (Fabricius)

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 18.7.96

WATER-

PRIMARY

AQC

COURSE: Bush

ANALYST: MJO

ANALYST:

SITE: Ballyhoe Bridge

CODE: 11 0264

SORT/AQC

METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Hydropsychidae \*

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

Hydropsychidae \*

1

Hydropsyche siltalai Dohler

### 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

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: N.Ireland  
WATER-  
COURSE: Aghadowey

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: MJO

DATE: 30.7.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

SITE: Whites Bridge

CODE: 11 0187

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Baetidae

7

Ephemerella ignita (Poda) (juv)

#### 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

Planorbidae

9

Gyraulus albus (Muller) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -1

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.7.96

WATER-  
COURSE: Aghivey

PRIMARY  
ANALYST: MJO

AQC  
ANALYST:

SITE: Moneycarrie Bridge

CODE: 11 0188

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Lymnaeidae	9
Lymnaea peregra (Muller)	
Glossiphoniidae	9
Glossiphonia complanata (L.) 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 6

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 24.6.96

WATER-

PRIMARY

AQC

COURSE: Newry Canal

ANALYST: MK

ANALYST:

SITE: Carnmeen

CODE: 11 0170

SORT/AQC

METHOD: Live

## RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

## VIAL

### BMWP taxa not found by IFE

Oligochaeta \*

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

Physidae

9

Physa fontinalis (L.)

Oligochaeta \*

1

Stylaria lacustris (L.) 1 only

Hydrophilidae (incl. Hydraenidae)

9

Hydraena gracilis Germar (a)

Helophorus (Atracthelophorus) brevipalpis Bedel (a)

Anacaena limbata (Fabricius) (a)

## SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 8

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 26.6.96

WATER-  
COURSE: Ballinderry

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Ballinderry Bridge

CODE: 11 0073

SORT/AQC  
METHOD: Live

## RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Rhyacophilidae (incl. Glossosomatidae) \* 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

Heptageniidae 9

Ecdyonurus sp. 1 only

Caenidae 9

Caenis luctuosa/macrura 1 only

Hydrophilidae (incl. Hydraenidae) 9

Hydraena gracilis Germar (a)

Helophorus (Atracthelophorus) brevipalpis Bedel (a)

Rhyacophilidae (incl. Glossosomatidae) \* 1

Rhyacophila dorsalis (Curtis)

Psychomyiidae (incl. Ecnomidae) 9

Psychomyia pusilla (Fabricius)

## SUMMARY OF AUDIT

LOSSES 0

GAINS 4

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 30

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: N.Ireland  
WATER-  
COURSE: Ballinderry

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: MK

DATE: 1.7.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

SITE: Corkhill Bridge

CODE: 11 0242

### RESULTS OF AUDIT

Family name	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	9
Pisidium sp. 1 only	
Hydropsychidae	9
Hydropsyche sp. (p) 1 only	
Tipulidae	9
Tipula sp. (juv) 1 only	

### SUMMARY OF AUDIT

LOSSES 0    GAINS 3    OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 13  
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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 22.7.96

WATER-  
COURSE: Glenariff

PRIMARY  
ANALYST: MK

AQC  
ANALYST:

SITE: Callisnagh Bridge

CODE: 11 0189

SORT/AQC  
METHOD: Live

## RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Oligochaeta *	1
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

Oligochaeta *	1
Enchytraeidae	
Asellidae	9
Asellus aquaticus (L.) 1 only	
Hydrophilidae (incl. Hydraenidae) *	1
Helophorus (Atracthelophorus) brevialpis Bedel (a)	
Hydropsychidae	9
Hydropsyche siltalai Dohler 1 only	

## SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 2

NET EFFECTS:

ON BMWP SCORE 8  
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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 16.7.96

WATER-  
COURSE: Larne

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Owens Bridge

CODE: 11 0218

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Lymnaeidae	9
Lymnaea sp. (juv)	
Sphaeriidae	9
Pisidium sp. 1 only	
Hydroptilidae	9
Ithytrichia sp. (p) 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 12

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 17.7.96

WATER-  
COURSE: Creevan Burn

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Creevan Cottage

CODE: 11 0293

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.7.96

WATER-  
COURSE: Macosquin River

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Ree Bridge

CODE: 11 0186

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Goeridae

9

Goera pilosa (Fabricius) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 8.8.96

WATER-  
COURSE: Lackey

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Knockballymore

CODE: 11 0158

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

#### VIAL

##### BMWP taxa not found by IFE

Planariidae (incl. Dugesiidae)	7
Dendrocoelum lacteum (Muller)	

##### Additional BMWP taxa found by IFE

Dendrocoelidae	7
Dendrocoelum lacteum (Muller)	

#### SAMPLE

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

N/a

##### Additional BMWP taxa found by IFE

Glossiphoniidae	9
Helobdella stagnalis (L.) 1 only	
Hydrophilidae (incl. Hydraenidae)	9
Helophorus (Atrachelophorus) brevipalpis Bedel (a) 1 only	
Hydroptilidae	9
Hydroptila sp. (p) 1 only	

### SUMMARY OF AUDIT

LOSSES 1

GAINS 4

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 14

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.7.96

WATER-  
COURSE: Macosquin River

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Ree Bridge

CODE: 11 0186

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Goeridae

9

Goera pilosa (Fabricius) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 8.8.96

WATER-  
COURSE: Lackey

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Knockballymore

CODE: 11 0158

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

#### VIAL

##### BMWP taxa not found by IFE

Planariidae (incl. Dugesiidae)	7
Dendrocoelum lacteum (Muller)	

##### Additional BMWP taxa found by IFE

Dendrocoelidae	7
Dendrocoelum lacteum (Muller)	

#### SAMPLE

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

N/a

##### Additional BMWP taxa found by IFE

Glossiphoniidae	9
Helobdella stagnalis (L.) 1 only	
Hydrophilidae (incl. Hydraenidae)	9
Helophorus (Atracthelophorus) brevipalpis Bedel (a) 1 only	
Hydroptilidae	9
Hydroptila sp. (p) 1 only	

### SUMMARY OF AUDIT

LOSSES 1

GAINS 4

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 14

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.9.96

WATER-  
COURSE: Quiggery

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Edergoole Bridge

CODE: 11 0016

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Halipilidae	9
Halipus fluviatilis Aube (a) 1 only	
Hydrophilidae (incl. Hydraenidae)	9
Hydraena gracilis Germar (a)	
Sericostomatidae	9
Sericostoma personatum (Spence) 1 only	

### 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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.9.96

WATER-  
COURSE: Cloughfin

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Blackhill

CODE: 11 0208

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Piscicolidae	9
Piscicola geometra (L.) 1 only	
Limnephilidae	9
Halesus radiatus (Curtis) (p) 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 11

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 2.10.96

WATER-  
COURSE: Strule

PRIMARY  
ANALYST: CAK

AQC  
ANALYST:

SITE: Stone Bridge

CODE: 11 0011

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Valvatidae	9
Valvata piscinalis (Muller)	
Nemouridae	9
Nemoura avicularis Morton 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 10

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: N.Ireland	LABORATORY: IRTU, Lisburn	DATE: 2.10.96
WATER- COURSE: Mourne	PRIMARY ANALYST: CAK	AQC ANALYST:
SITE: Victoria Bridge	CODE: 11 0269	SORT/AQC METHOD: Live

RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

Haliplidae	6
Haliphus sp. (l)	
Hydrophilidae (incl. Hydraenidae)	6
Hydraena gracilis Germar (a)	

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Ephemerellidae	9
Ephemerella ignita (Poda) 1 only	

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 30.9.96

WATER-  
COURSE: Killyclougher Burn

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Killyclougher

CODE: 11 0258

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Leptoceridae

Mystacides azurea (L.) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 2.10.96

WATER-  
COURSE: Owenreagh

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Cashel Bridge

CODE: 11 0254

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

9

Hydroptila sp. 1 only

### SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 6

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 7.10.96

WATER-  
COURSE: Glenelly

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Clogherney

CODE: 11 0176

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

#### VIAL

##### BMWP taxa not found by IFE

Asellidae	5
Leptoceridae	7

##### Additional BMWP taxa found by IFE

Lepidostomatidae	7
Lepidostoma hirtum (Fabricius)	
Sericostomatidae	7
Sericostoma personatum (Spence) 1 only	

#### SAMPLE

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

N/a

##### Additional BMWP taxa found by IFE

Chloroperlidae	9
Chloroperla torrentium (Pictet) 1 only	

### SUMMARY OF AUDIT

LOSSES 2

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 17

ON NO. OF TAXA 1

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 7.10.96

WATER-  
COURSE: Glenelly

PRIMARY  
ANALYST: CC

AQC  
ANALYST:

SITE: Corrick Bridge

CODE: 11 0009

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 25.9.96

WATER-  
COURSE: Moneycarragh

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Moneylane

CODE: 11 0237

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

9

Glossiphonia complanata (L.)

Helobdella stagnalis (L.)

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 25.9.96

WATER-  
COURSE: Ardilea

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: A2 Bridge

CODE: 11 0236

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Hydrobiidae (incl. Bithyniidae)	9
Potamopyrgus jenkinsi (Smith) 1 only	
Hydrophilidae (incl. Hydraenidae)	9
Hydraena gracilis Germar (a) 1 only	
Polycentropodidae	9
Plectrocnemia? sp. (juv) 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 15

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 2.10.96

WATER-  
COURSE: Owenkillew

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Killymore Bridge

CODE: 11 0008

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

BMWP taxa not found by IFE

Gammaridae (incl. Crangonyctidae)

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

None

### SUMMARY OF AUDIT

LOSSES 1

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -6

ON NO. OF TAXA -1

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 2.10.96

WATER-  
COURSE: Cappagh Burn

PRIMARY  
ANALYST: IO'N

AQC  
ANALYST:

SITE: Tattynure Bridge

CODE: 11 0201

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 23.9.96

WATER-  
COURSE: Annacloy

PRIMARY  
ANALYST: MB

AQC  
ANALYST:

SITE: Annacloy Bridge

CODE: 11 0109

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Leptoceridae

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

Valvatidae

9

Valvata piscinalis (Muller)

Valvata cristata Muller

### 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

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 25.9.96

WATER-  
COURSE: Glynn

PRIMARY  
ANALYST: MB

AQC  
ANALYST:

SITE: Glynn

CODE: 11 0217

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Leptoceridae 7

#### Additional BMWP taxa found by IFE

Limnephilidae 7

Drusus annulatus (Stephens)

### SAMPLE

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

N/a

#### Additional BMWP taxa found by IFE

Erpobdellidae 9

Indet Erpobdellidae (juv) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

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: N.Ireland  
WATER-  
COURSE: Camowen

LABORATORY: IRTU, Lisburn  
PRIMARY  
ANALYST: MB

DATE: 30.9.96  
AQC  
ANALYST:  
SORT/AQC  
METHOD: Live

SITE: Granny Bridge

CODE: 11 0014

### RESULTS OF AUDIT

Family name	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)

9

Hydraena gracilis Germar (a) 1 only

### 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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 2.10.96

WATER-  
COURSE: Strule

PRIMARY  
ANALYST: MB

AQC  
ANALYST:

SITE: Abercorn

CODE: 11 0007

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 17.9.96

WATER-  
COURSE: Ballygawley Water

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Lismore Bridge

CODE: 11 0230

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	Presumed cause of error (see footnotes)
-------------	---

### VIAL

#### BMWP taxa not found by IFE

Heptageniidae

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

None

### SUMMARY OF AUDIT

LOSSES 1

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -10

ON NO. OF TAXA -1

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 9.10.96

WATER-

PRIMARY

AQC

COURSE: Creevan Burn

ANALYST: PRH

ANALYST:

SITE: Creevan Cottage

CODE: 11 0293

SORT/AQC

METHOD: Live

### RESULTS OF AUDIT

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

#### BMWP taxa not found by IFE

Scirtidae 4

Hydropsychidae \* 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

Hydropsychidae \* 1

Hydropsyche sp. (juv) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 0

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE -5

ON NO. OF TAXA -1

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 22.10.96

WATER-  
COURSE: Curly

PRIMARY  
ANALYST: PRH

AQC  
ANALYST:

SITE: Artikelly

CODE: 11 0026

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

Family name	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

Lepidostomatidae	9
Lepidostoma hirtum (Fabricius) 1 only	
Sericostomatidae	9
Sericostoma personatum (Spence) 1 only	

### SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

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: N.Ireland

LABORATORY: IRTU, Lisburn

DATE: 11.9.96

WATER-  
COURSE: Braid

PRIMARY  
ANALYST: PRH

AQC  
ANALYST: IO'N

SITE: Knockan Bridge

CODE: 11 0035

SORT/AQC  
METHOD: Live

### RESULTS OF AUDIT

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

#### BMWP taxa not found by IFE

Perlodidae 7

#### Additional BMWP taxa found by IFE

Perlidae 7

Indet Perlidae (juv)

### SAMPLE

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

N/a

#### Additional BMWP taxa found by IFE

Planorbidae 11

Bathyomphalus contortus (L.) 1 only

### SUMMARY OF AUDIT

LOSSES 1

GAINS 2

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)

**Centre for  
Ecology &  
Hydrology**

Institute of Freshwater Ecology  
Institute of Hydrology  
Institute of Terrestrial Ecology  
Institute of Virology & Environmental Microbiology

**Natural Environment Research Council**