



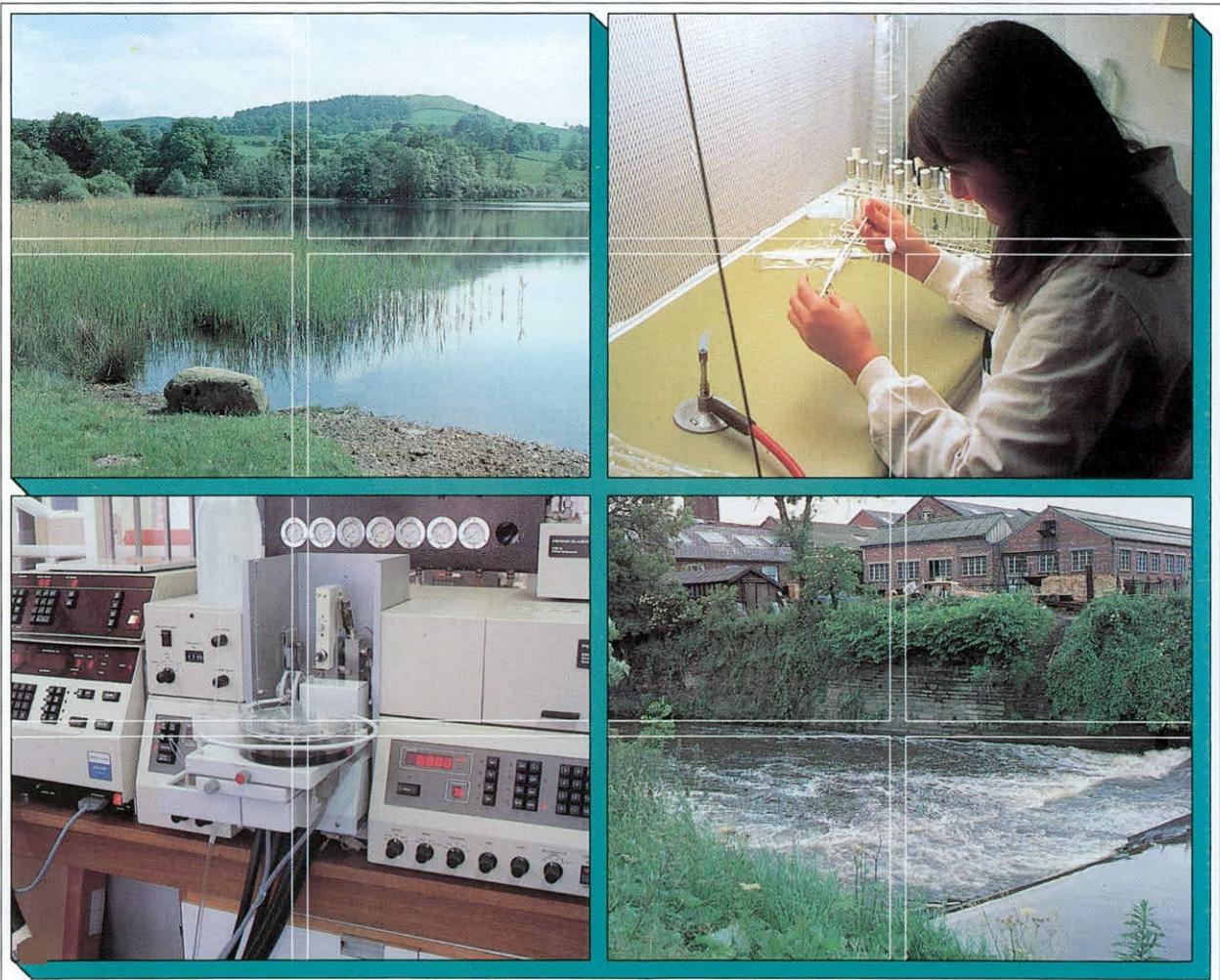
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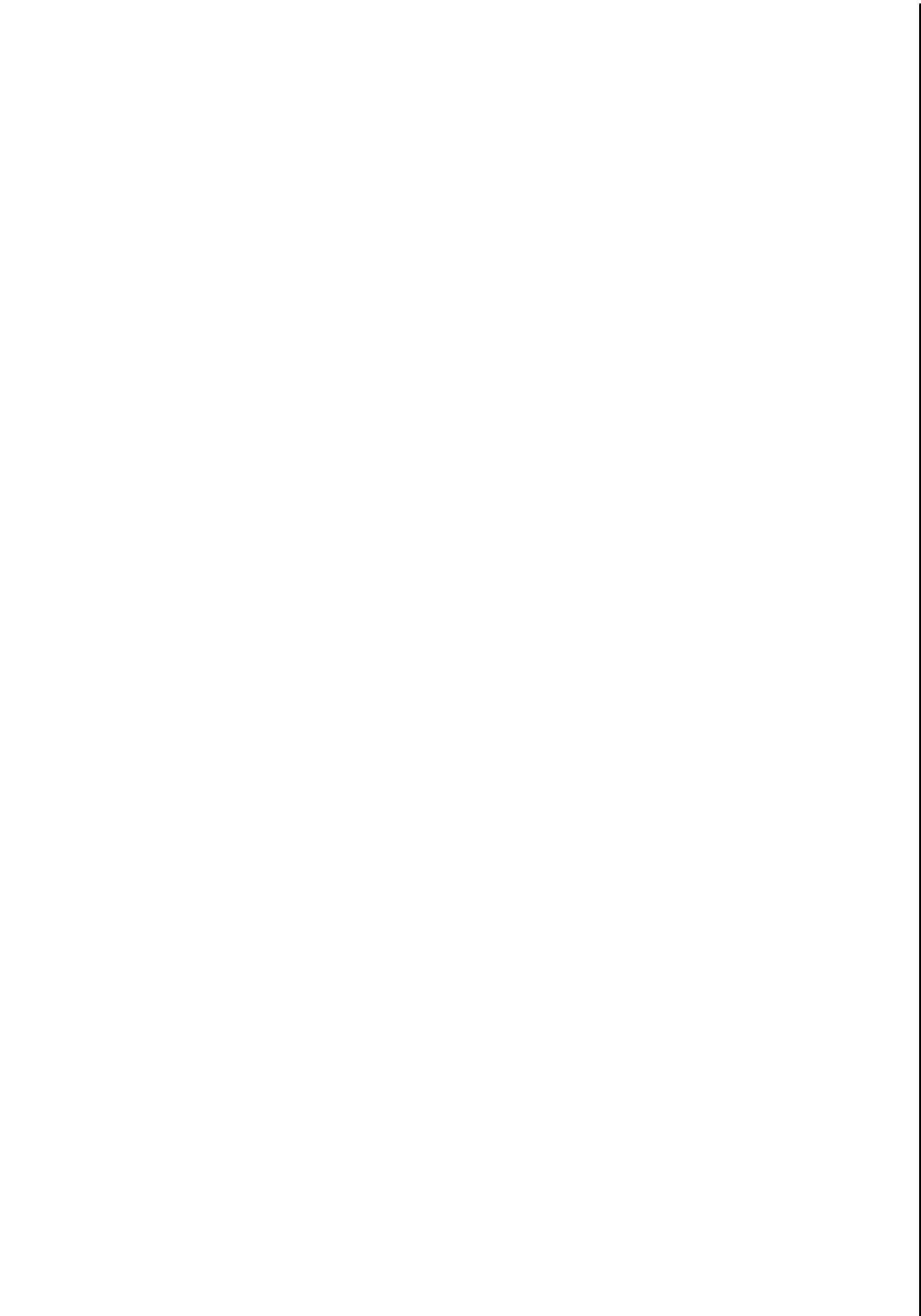
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Report To:

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An audit of performance in the analysis of biological samples in 1996 SEPA West Region

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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) inspector. For most agencies, these inspectors 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. Where samples sent to IFE had been subjected to an internal AQC inspection, the audit provided a measure of the quality of performance of the AQC analyst rather than the primary analyst.

This report presents the results of the audit of 42 samples analysed by SEPA West 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 the two SEPA West laboratories are summarised in Tables 1 and 2. Table 3 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, for each laboratory and for the region as a whole. Table 4 presents data for SEPA West for the net effects of the audit on the BMWP score and number of taxa. This table is again based on the target of no more than two missed taxa per sample. The figure of 13 for an acceptable underestimate of BMWP score is based on twice the average score of all taxa in the BMWP listing (excluding Clambidae, Chrysomelidae and Curculionidae, which are excluded from the audit). This average score is 6.57. Table 5 lists, at family level, the taxa missed in sorting by SEPA West's analysts in the 1996 audit. Table 6 lists the species missed by SEPA West's biologists, as found by the 1996 audit. Tables 7 and 8 list missed taxa at family and species levels for all SEPA analysts and Tables 9 and 10 give similar listings for the entire 1996 audit for the whole of the UK.

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 7 samples audited for the Dumfries Laboratory of SEPA West

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Dalswinton Loch Tributary	u/s Dalswinton STW (1)	AB	0	1	0
Glen Burn	u/s New Abbey F/S (1)	ML	0	0	0
Blackmark Burn	Site 2	ML	0	0	0
SUMMER					
Black Esk Tributary	Site 1 U/S	BR	0	5	0
Kettleton Burn	Site 1 U/S	ML	0	0	0
AUTUMN					
Old Water	u/s Killylour F/S Site 1	AB	1	0	0
Kirk Burn	u/s Burnbrae S/W site 1	BR	0	0	0

Table 2 The 35 samples audited for the East Kilbride Laboratory of SEPA West

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
White Cart Water	Linn Park	KA	0	1	0
Clyde	Wolfclyde	KA	0	4	0
Clyde	Highlees	KA	0	0	0
North Calder Water	Wester Moffat Farm	LM	0	0	0
Glazert Water	Lennoxton Bridge	LM	0	0	0
White Cart Water	Stamperland	MC	0	0	0
Glazert Water	Station Rd Bridge	MC	0	1	0
Endrick Water	d/s Fintry STW	MT	0	1	0
White Cart Water	Holehouse Ford	RW	0	0	0
Blane	Blane Bridge	RW	0	3	1
Abhainn Srathainn	u/s A83 Bridge (d/s Fish Farm)	SC	0	2	0
Feochan Bheag	d/s Fish Farm	SC	0	0	0
Glen Burn	u/s Fish Farm	SC	1	2	0
Duisk Water	Pinwherry Bridge	SD	0	0	0
SUMMER					
Sorn	u/s Roundpool	KA	0	0	0
Water of Tig	Tig Bridge	LM	0	0	0
Water of Assel	d/s Barbae Burn	LM	0	2	0
Auchter Water	d/s Hydrachrome	MC	0	1	0
Kelvin	Auchinstarry	MT	0	0	0
Clerkland Burn	d/s Craignaught Quarry	MT	0	0	0
Laggan	Laggan Bridge	RW	1	1	1
Doon	u/s Fish Farm	SC	0	0	1
Doon	B7043 Bridge	SC	0	1	0
Luggie Burn	u/s North Calder confluence	SD	1	1	0
Burn of Lig	d/s Bridge	SD	0	0	0
Clerkland Burn	u/s Craignaught Quarry	SD	0	2	0
AUTUMN					
Water of Tig	Tig Bridge	KA	0	2	0
Espedair Burn	d/s Sewage man-hole	LM	0	1	0
Balinakill Burn	d/s Fish Farm	MC	0	0	0
Gryfe	Milton Bridge	MC	0	0	0
Annick Water	North Ayrshire Markets	MT	0	2	0
Duisk Water	Duisk Bridge	MT	0	0	0
Stinchar	d/s Glenburnie House	RW	0	1	0
White Cart Water	u/s Eaglesham STW	RW	0	3	0
Allt Mor Burn	u/s Fish Farm	SD	0	0	0

Table 3 Statistics of the 1996 audit results for SEPA West

Analyst/Group	n	Mean gains	Standard error	No.samples >2 gains	% samples >2 gains	Highest no. gains	Mean errors (l+g+o)	Standard error
Dumfries	7	1	0.70	1	14.29	5	1.00	0.69
AB	2	1	0.50	0	0.00	1	1.00	0.00
BR	2	3	2.50	1	50.00	5	2.50	2.50
ML	3	0	0.00	0	0.00	0	0.00	0.00
East Kilbride	35	1	0.18	3	8.57	4	1.06	0.21
KA	5	1.40	0.75	1	20.00	4	1.40	0.75
LM	5	0.60	0.40	0	0.00	2	0.60	0.40
MC	5	0.40	0.24	0	0.00	1	0.40	0.24
MT	5	0.60	0.40	0	0.00	2	0.60	0.40
RW	5	1.60	0.60	2	40.00	3	2.20	0.73
SC	5	1	0.45	0	0.00	2	1.40	0.51
SD	5	0.6	0.40	0	0.00	2	0.80	0.49
SEPA West	42	0.881	0.19	4	9.52	5	1.05	0.20

Table 4 Net effects of the Audit on BMWP score and number of scoring taxa for SEPA West

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
Dumfries	7	6.29	14.29	42	0.71	14.29	5
AB	2	1.00	0.00	5	0.00	0.00	1
BR	2	21.00	50.00	42	2.50	50.00	5
ML	3	0.00	0.00	0	0.00	0.00	0
East Kilbride	35	5.00	11.43	25	0.77	8.57	4
KA	5	8.60	40.00	25	1.40	20.00	4
LM	5	4.40	20.00	17	0.60	0.00	2
MC	5	4.00	0.00	10	0.40	0.00	1
MT	5	3.00	0.00	10	0.40	0.00	1
RW	5	8.20	20.00	20	1.40	40.00	3
SC	5	4.20	0.00	11	0.80	0.00	2
SD	5	2.60	0.00	13	0.40	0.00	2
SEPA West	42	5.21	11.90	42	0.76	9.52	5

Table 5 The families missed by SEPA West Region's analysts

Family	n	% of SEPA West Region's missed taxa in AQC Audit
Caenidae	2	6.25
Hydroptilidae	2	6.25
Lepidostomatidae	2	6.25
Nemouridae	2	6.25
Planariidae (incl. Dugesiidae)	2	6.25
Psychomyiidae (incl. Ecnomidae)	2	6.25
Sericostomatidae	2	6.25
Simuliidae	2	6.25
Asellidae	1	3.13
Brachycentridae	1	3.13
Chironomidae	1	3.13
Dendrocoelidae	1	3.13
Elmidae	1	3.13
Ephemerellidae	1	3.13
Glossiphoniidae	1	3.13
Gyrinidae	1	3.13
Leptoceridae	1	3.13
Leptophlebiidae	1	3.13
Lymnaeidae	1	3.13
Odontoceridae	1	3.13
Oligochaeta	1	3.13
Perlidae	1	3.13
Rhyacophilidae (incl. Glossosomatidae)	1	3.13
Sphaeriidae	1	3.13
TOTAL	32	100.00

Table 6 The species missed by SEPA West Region's analysts

Species	n	% of SEPA West Region's missed taxa in AQC Audit
Hydroptila sp.	2	6.25
Simulium (Nevermannia) cryophilum group	2	6.25
Caenis rivulorum Eaton	2	6.25
Sericostoma personatum (Spence)	2	6.25
Tanytarsini	1	3.13
Nemurella picteti Klapalek	1	3.13
Rhyacophila sp.	1	3.13
Psychomyia pusilla (Fabricius)	1	3.13
Polycelis felina (Dalyell)	1	3.13
Pisidium sp.	1	3.13
Perla bipunctata Pictet	1	3.13
Orectochilus villosus (Muller)	1	3.13
Tinodes waeneri (L.)	1	3.13
Odontocerum albicorne (Scopoli)	1	3.13
Nemoura cambrica/erratica	1	3.13
Lymnaea peregra (Muller)	1	3.13
Lepidostoma hirtum (Fabricius)	1	3.13
Habrophlebia fusca (Curtis)	1	3.13
Glossiphonia heteroclita (L.)	1	3.13
Ephemerella ignita (Poda)	1	3.13
Elmis aenea (Muller)	1	3.13
Dugesia polychroa/lugubris	1	3.13
Crunoecia irrorata (Curtis)	1	3.13
Brachycentrus subnubilus Curtis	1	3.13
Athripsodes bilineatus (L.)	1	3.13
Asellus aquaticus (L.)	1	3.13
Tubificidae	1	3.13
Dendrocoelum lacteum (Muller)	1	3.13
TOTAL	32	100.00

Table 7. The families missed by SEPA's analysts in the 1996 audit

Family	n	% of missed taxa for SEPA audits
Hydrophilidae (incl. Hydraenidae)	10	5.85
Caenidae	9	5.26
Lymnaeidae	8	4.68
Planariidae (incl. Dugesiidae)	8	4.68
Psychomyiidae (incl. Ecnomidae)	8	4.68
Simuliidae	8	4.68
Hydroptilidae	7	4.09
Lepidostomatidae	7	4.09
Nemouridae	7	4.09
Sphaeriidae	7	4.09
Elmidae	6	3.51
Sericostomatidae	6	3.51
Goeridae	5	2.92
Rhyacophilidae (incl. Glossosomatidae)	5	2.92
Chloroperlidae	4	2.34
Dytiscidae (incl. Noteridae)	4	2.34
Ephemerellidae	4	2.34
Leptoceridae	4	2.34
Oligochaeta	4	2.34
Ancylidae (incl. Acroloxidae)	3	1.75
Chironomidae	3	1.75
Glossiphoniidae	3	1.75
Gyrinidae	3	1.75
Hydrobiidae (incl. Bithyniidae)	3	1.75
Leptophlebiidae	3	1.75
Leuctridae	3	1.75
Limnephilidae	3	1.75
Polycentropodidae	3	1.75
Heptageniidae	2	1.17
Odontoceridae	2	1.17
Planorbidae	2	1.17
Scirtidae	2	1.17
Taeniopterygidae	2	1.17
Tipulidae	2	1.17
Asellidae	1	0.58
Brachycentridae	1	0.58
Capniidae	1	0.58
Dendrocoelidae	1	0.58
Haliplidae	1	0.58
Hydropsychidae	1	0.58
Perlidae	1	0.58
Perlodidae	1	0.58
Sialidae	1	0.58
Siphonuridae	1	0.58
Valvatidae	1	0.58
TOTAL	171	100.00

Table 8. The species missed by SEPA's analysts in the 1996 audit

Species Description	n	% of missed species for SEPA audits
Hydraena gracilis Germar	9	5.00
Caenis rivulorum Eaton	9	5.00
Hydroptila sp.	7	3.89
Pisidium sp.	7	3.89
Elmis aenea (Muller)	6	3.33
Sericostoma personatum (Spence)	6	3.33
Lepidostoma hirtum (Fabricius)	5	2.78
Lymnaea peregra (Muller)	5	2.78
Ephemerella ignita (Poda)	4	2.22
Oreodytes sanmarkii (Sahlberg)	4	2.22
Psychomyia pusilla (Fabricius)	4	2.22
Silo pallipes (Fabricius)	4	2.22
Chloroperla torrentium (Pictet)	4	2.22
Potamopyrgus jenkinsi (Smith)	3	1.67
Dugesia polychroa/lugubris	3	1.67
Orectochilus villosus (Muller)	3	1.67
Polycelis felina (Dalyell)	3	1.67
Rhyacophila dorsalis (Curtis)	3	1.67
Tinodes waeneri (L.)	3	1.67
Ancylus fluviatilis Muller	3	1.67
Simulium (Simulium) ornatum group	3	1.67
Odontocerum albicorne (Scopoli)	2	1.11
Habrophlebia fusca (Curtis)	2	1.11
Leuctra fusca (L.)	2	1.11
Gyraulus albus (Muller)	2	1.11
Limnæbius truncatellus (Thunberg)	2	1.11
Lymnaea sp.	2	1.11
Simulium argyreatum/variegatum	2	1.11
Nemoura cambrica/erratica	2	1.11
Elodes sp.	2	1.11
Orthocladiinae	2	1.11
Brachyptera risi (Morton)	2	1.11
Simulium (Nevermannia) cryophilum group	2	1.11
Athripsodes bilineatus (L.)	2	1.11
Enchytraeidae	2	1.11
Crunoecia irrorata (Curtis)	2	1.11
Ecdyonurus sp.	2	1.11
Glossiphonia complanata (L.)	1	0.56
Haliphus lineatocollis (Marsham)	1	0.56
Ameletus inopinatus Eaton	1	0.56
Capnia sp.	1	0.56
Amphinemura sulcicollis (Stephens)	1	0.56
Athripsodes commutatus (Rostock)	1	0.56
Crenobia alpina/Phagocata vitta	1	0.56
Glossiphonia heteroclita (L.)	1	0.56
Dendrocoelum lacteum (Muller)	1	0.56
Athripsodes albifrons/bilineatus	1	0.56
Lumbricidae	1	0.56
Dicranota sp.	1	0.56
Brachycentrus subnubilus Curtis	1	0.56

Table 8 continued

Species Description	n	% of missed species for SEPA
Helobdella stagnalis (L.)	1	0.56
Antocha vitripennis (Meigen)	1	0.56
Ecclisopteryx guttulata (Pictet)	1	0.56
Asellus aquaticus (L.)	1	0.56
Glossosoma sp.	1	0.56
Rhyacophila sp.	1	0.56
Polycentropus flavomaculatus/kingi	1	0.56
Limnephilidae indet	1	0.56
Prosimulium hirtipes/tomosvaryi	1	0.56
Protonemura meyeri (Pictet)	1	0.56
Helophorus (Atracthelophorus) brevivalpis Bedel	1	0.56
Psychomyiidae indet	1	0.56
Polycentropus flavomaculatus (Pictet)	1	0.56
Sialis sp.	1	0.56
Silo sp.	1	0.56
Simulium (Nevermannia) vernum Macquart	1	0.56
Simulium (Simulium) argyreatum Meigen	1	0.56
Simulium sp.	1	0.56
Tanytarsini	1	0.56
Tubificidae	1	0.56
Protonemura sp.	1	0.56
Lymnaea stagnalis (L.)	1	0.56
Helophorus (Meghelophorus) aequalis Thomson	1	0.56
Hydropsyche siltalai Dohler	1	0.56
Leuctra inermis Kempny	1	0.56
Agapetus sp.	1	0.56
Potamophylax cingulatus/latipennis	1	0.56
Valvata piscinalis (Muller)	1	0.56
Polycelis sp.	1	0.56
Nemoura sp.	1	0.56
Nemurella picteti Klapalek	1	0.56
Paraleptophlebia sp.	1	0.56
Paraleptophlebia submarginata (Stephens)	1	0.56
Perla bipunctata Pictet	1	0.56
Perlodes microcephala (Pictet)	1	0.56
Plectrocnemia conspersa (Curtis)	1	0.56
Limnius volckmari (Panzer)	1	0.56
TOTAL	180	100.00

Table 9 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
Haliplidae	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 9 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
TOTAL	1442	100.00

Table 10 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
Halipus 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 10 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 (Marsham)	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 10 continued

Species	n	% of missed species in 1996 audit
<i>Haliplus 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> (Mclachlan)	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
Chironomini	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
Erioptera sp.	2	0.13
<i>Amphinemura sulcicollis</i> (Stephens)	2	0.13
<i>Cyrnus trimaculatus</i> (Curtis)	2	0.13
Enchytraeidae	2	0.13
<i>Anabolia nervosa</i> (Curtis)	2	0.13

Table 10 continued

Species	n	% of missed species in 1996 audit
Glossiphoniidae indet	2	0.13
Lymnaea 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 10 continued

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

Table 10 continued

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

APPENDIX

Results of individual sample audits

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: Dumfries

DATE: 7.2.97

WATER-
COURSE: Glen Burn

PRIMARY
ANALYST: ML

AQC
ANALYST:

SITE: u/s New Abbey F/S (1)

CODE:

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: Dumfries

DATE: 4.3.97

WATER-
COURSE: Blackmark Burn

PRIMARY
ANALYST: ML

AQC
ANALYST:

SITE: Site 2

CODE:

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: Dumfries

DATE: 27.6.96

WATER-COURSE: Black Esk Tributary

PRIMARY ANALYST: BR

AQC ANALYST:

SITE: Site 1 U/S

CODE:

SORT/AQC METHOD: Not known

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

Nemouridae	9
Nemoura cambrica/erratica 1 only	
Brachycentridae	9
Brachycentrus subnubilus Curtis 1 only	
Lepidostomatidae	9
Crunoecia irrorata (Curtis) 1 only	
Odontoceridae	9
Odontocerum albicorne (Scopoli)	
Simuliidae	9
Simulium (Nevermannia) cryophilum group	

SUMMARY OF AUDIT

LOSSES 0

GAINS 5

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 42

ON NO. OF TAXA 5

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: Dumfries

DATE: 26.6.96

WATER-
COURSE: Kettleton Burn

PRIMARY
ANALYST: ML

AQC
ANALYST:

SITE: Site 1 U/S

CODE:

SORT/AQC
METHOD: Not known

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: SEPA West

LABORATORY: Dumfries

DATE: 17.12.96

WATER-
COURSE: Old Water

PRIMARY
ANALYST: AB

AQC
ANALYST:

SITE: u/s Killylour F/S Site 1

CODE:

SORT/AQC
METHOD: Preserved

RESULTS OF AUDIT

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

VIAL

BMWP taxa not found by IFE

Planorbidae

2

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 -3

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: SEPA West

LABORATORY: Dumfries

DATE: 17.12.96

WATER-COURSE: Kirk Burn

PRIMARY ANALYST: BR

AQC ANALYST:

SITE: u/s Burnbrae S/W site 1

CODE:

SORT/AQC METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 12.4.96

WATER-COURSE: White Cart Water

PRIMARY ANALYST: KA

AQC ANALYST:

SITE: Linn Park

CODE: 96/49

SORT/AQC METHOD: Preserved

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 heteroclita (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: SEPA West

LABORATORY: East Kilbride

DATE: 15.5.96

WATER-
COURSE: Clyde

PRIMARY
ANALYST: KA

AQC
ANALYST:

SITE: Wolfclyde

CODE: 96/122

SORT/AQC
METHOD: Preserved

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

Oligochaeta	9
Spirosperma ferox (Eisen) 1 only	
EphemereUidae	9
EphemereUa ignita (Poda) (juv) 1 only	
Hydroptilidae	9
Hydroptila sp.	
Psychomyiidae (incl. Ecnomidae)	9
Psychomyia pusilla (Fabricius)	

SUMMARY OF AUDIT

LOSSES 0 GAINS 4 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 25

ON NO. OF TAXA 4

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: SEPA West

LABORATORY: East Kilbride

DATE: 15.5.96

WATER-
COURSE: Clyde

PRIMARY
ANALYST: KA

AQC
ANALYST:

SITE: Highlees

CODE: 96/126

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 30.7.96

WATER-
COURSE: North Calder Water

PRIMARY
ANALYST: LM

AQC
ANALYST:

SITE: Wester Moffat Farm

CODE: 96/363

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 20.5.96

WATER-
COURSE: Glazert Water

PRIMARY
ANALYST: LM

AQC
ANALYST:

SITE: Lennoxtown Bridge

CODE: 96/136

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 12.4.96

WATER-COURSE: White Cart Water

PRIMARY ANALYST: MC

AQC ANALYST:

SITE: Stamperland

CODE: 96/48

SORT/AQC METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 20.5.96

WATER-
COURSE: Glazert Water

PRIMARY
ANALYST: MC

AQC
ANALYST:

SITE: Station Rd Bridge

CODE: 96/135

SORT/AQC
METHOD: Preserved

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

Perlidae

Perla bipunctata Pictet 1 only

9

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: SEPA West

LABORATORY: East Kilbride

DATE: 10.4.96

WATER-
COURSE: Endrick Water

PRIMARY
ANALYST: MT

AQC
ANALYST:

SITE: d/s Fintry STW

CODE: 96/37

SORT/AQC
METHOD: Preserved

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

Planariidae (incl. Dugesiiidae)

9

Polycelis felina (Dalyell) 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

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: SEPA West

LABORATORY: East Kilbride

DATE: 12.4.96

WATER-COURSE: White Cart Water

PRIMARY ANALYST: RW

AQC ANALYST:

SITE: Holehouse Ford

CODE: 96/46

SORT/AQC METHOD: Preserved

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: SEPA West	LABORATORY: East Kilbride	DATE: 10.4.96
WATER-COURSE: Blanc	PRIMARY ANALYST: RW	AQC ANALYST:
SITE: Blanc Bridge	CODE: 96/41	SORT/AQC METHOD: Preserved

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

Oligochaeta *	1
Tubificidae	
Asellidae	9
Asellus aquaticus (L.)	
Caenidae	9
Caenis rivulorum Eaton	
Leptoceridae	9
Athripsodes bilineatus (L.) 1 only	

SUMMARY OF AUDIT

LOSSES 0	GAINS 3	OMISSIONS: 1	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: SEPA West

LABORATORY: East Kilbride

DATE: 3.4.96

WATER-

PRIMARY

AQC

COURSE: Abhainn Srathainn

ANALYST: SC

ANALYST:

SITE: u/s A83 Bridge (d/s Fish Farm)

CODE: 96/25

SORT/AQC

METHOD: Preserved

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

Dendrocoelidae

9

Dendrocoelum lacteum (Muller) 1 only

Hydroptilidae

9

Hydroptila sp. 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

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: SEPA West

LABORATORY: East Kilbride

DATE: 3.4.96

WATER-COURSE: Feochan Bheag

PRIMARY ANALYST: SC

AQC ANALYST:

SITE: d/s Fish Farm

CODE: 96/33

SORT/AQC METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 3.5.96

WATER-COURSE: Glen Burn

PRIMARY ANALYST: SC

AQC ANALYST:

SITE: u/s Fish Farm

CODE: 96/80

SORT/AQC METHOD: Preserved

RESULTS OF AUDIT

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

VIAL

BMWP taxa not found by IFE

Chrysomelidae	2
Chrysomelidae/Curculionidae not included in audit	

Additional BMWP taxa found by IFE

Limnephilidae	6
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

Simuliidae	9
Simulium (Nevermannia) cryophilum group 1 only	

SUMMARY OF AUDIT

LOSSES 1

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 7

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: East Kilbride

DATE: 7.5.96

WATER-
COURSE: Duisk Water

PRIMARY
ANALYST: SD

AQC
ANALYST:

SITE: Pinwherry Bridge

CODE: 96/94

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 23.8.96

WATER-COURSE: Sorn

PRIMARY ANALYST: KA

AQC ANALYST:

SITE: u/s Roundpool

CODE: 96/436

SORT/AQC METHOD: Preserved

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: SEPA West
WATER-COURSE: Water of Tig
SITE: Tig Bridge

LABORATORY: East Kilbride
PRIMARY ANALYST: LM
CODE: 96/312

DATE: 16.7.96
AQC ANALYST:
SORT/AQC METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 12.8.96

WATER-
COURSE: Water of Assel

PRIMARY
ANALYST: LM

AQC
ANALYST:

SITE: d/s Barbae Burn

CODE: 96/398

SORT/AQC
METHOD: Preserved

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

Rhyacophilidae (incl. Glossosomatidae)	9
Rhyacophila sp. (juv)	
Sericostomatidae	9
Sericostoma personatum (Spence) 1 only	

SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 17
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: SEPA West

LABORATORY: East Kilbride

DATE: 12.7.96

WATER-COURSE: Auchter Water

PRIMARY ANALYST: MC

AQC ANALYST:

SITE: d/s Hydrachrome

CODE: 96/302

SORT/AQC METHOD: Preserved

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

Leptophlebiidae

9

Habrophlebia fusca (Curtis) 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

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: SEPA West

LABORATORY: East Kilbride

DATE: 28.8.96

WATER-
COURSE: Kelvin

PRIMARY
ANALYST: MT

AQC
ANALYST:

SITE: Auchinstarry

CODE: 96/453

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 14.6.96

WATER-
COURSE: Clerkland Burn

PRIMARY
ANALYST: MT

AQC
ANALYST:

SITE: d/s Craignaught Quarry

CODE: 96/198

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 23.8.96

WATER-COURSE: Laggan

PRIMARY ANALYST: RW

AQC ANALYST:

SITE: Laggan Bridge

CODE: 96/438

SORT/AQC METHOD: Preserved

RESULTS OF AUDIT

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

VIAL

BMWP taxa not found by IFE

Lymnaeidae *	7
Succineidae	
Dryopidae	1
Note on data sheet "in Reference collection"	

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 *	7
Lymnaea peregra/palustris (juv) 1 only	
Nemouridae	9
Nemurella picteti Klapalek 1 only	

SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 2

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: East Kilbride

DATE: 23.7.96

WATER-COURSE: Doon

PRIMARY ANALYST: SC

AQC ANALYST:

SITE: u/s Fish Farm

CODE: 96/333

SORT/AQC METHOD: Preserved

RESULTS OF AUDIT

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

VIAL

BMWP taxa not found by IFE

Baetidae * 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

Baetidae * 1

Baetis rhodani (Pictet)

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: East Kilbride

DATE: 23.7.96

WATER-
COURSE: Doon

PRIMARY
ANALYST: SC

AQC
ANALYST:

SITE: B7043 Bridge

CODE: 96/334

SORT/AQC
METHOD: Preserved

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

Lymnaea peregra (Muller) 1 only

9

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: SEPA West

LABORATORY: East Kilbride

DATE: 30.7.96

WATER-
COURSE: Luggie Burn

PRIMARY
ANALYST: SD

AQC
ANALYST:

SITE: u/s North Calder confluence

CODE: 96/369

SORT/AQC
METHOD: Preserved

RESULTS OF AUDIT

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

VIAL

BMWP taxa not found by IFE

Planorbidae

7

Additional BMWP taxa found by IFE

Valvatidae

7

Valvata cristata Muller

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 1 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: SEPA West

LABORATORY: East Kilbride

DATE: 12.8.96

WATER-
COURSE: Burn of Lig

PRIMARY
ANALYST: SD

AQC
ANALYST:

SITE: d/s Bridge

CODE: 96/400

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 14.6.96

WATER-COURSE: Clerkland Burn

PRIMARY ANALYST: SD

AQC ANALYST:

SITE: u/s Craignaught Quarry

CODE: 96/197

SORT/AQC METHOD: Preserved

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

Tipulidae

Limnophila sp.

Dicranota sp.

6

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)

Tinodes waeneri (L.) 1 only

9

SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 13

ON NO. OF TAXA 2

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: East Kilbride

DATE: 9.9.96

WATER-COURSE: Water of Tig

PRIMARY ANALYST: KA

AQC ANALYST:

SITE: Tig Bridge

CODE: 96/492

SORT/AQC METHOD: Preserved

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

Limnephilidae was correct identification

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

Lepidostomatidae 9

Lepidostoma hirtum (Fabricius)

SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 15

ON NO. OF TAXA 2

1 No representative of family in vial

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: SEPA West

LABORATORY: East Kilbride

DATE: 26.9.96

WATER-COURSE: Espedair Burn

PRIMARY ANALYST: LM

AQC ANALYST:

SITE: d/s Sewage man-hole

CODE: 96/614

SORT/AQC METHOD: Preserved

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

Planariidae (incl. Dugesiidae)

9

Dugesia polychroa/lugubris 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

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: SEPA West

LABORATORY: East Kilbride

DATE: 1.11.95

WATER-
COURSE: Balinakill Burn

PRIMARY
ANALYST: MC

AQC
ANALYST:

SITE: d/s Fish Farm

CODE: 95/909

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 26.11.96

WATER-
COURSE: Gryfe

PRIMARY
ANALYST: MC

AQC
ANALYST:

SITE: Milton Bridge

CODE: 96/762

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 6.9.96

WATER-

PRIMARY

AQC

COURSE: Annick Water

ANALYST: MT

ANALYST:

SITE: North Ayrshire Markets

CODE: 96/482

SORT/AQC

METHOD: Preserved

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

Sericostomatidae

9

Sericostoma personatum (Spence)

SUMMARY OF AUDIT

LOSSES 0

GAINS 2

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: SEPA West

LABORATORY: East Kilbride

DATE: 9.9.96

WATER-
COURSE: Duisk Water

PRIMARY
ANALYST: MT

AQC
ANALYST:

SITE: Duisk Bridge

CODE: 96/489

SORT/AQC
METHOD: Preserved

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: SEPA West

LABORATORY: East Kilbride

DATE: 14.11.96

WATER-COURSE: Stinchar

PRIMARY ANALYST: RW

AQC ANALYST:

SITE: d/s Glenburnie House

CODE: 96/721

SORT/AQC METHOD: Preserved

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

Caenidae

Caenis rivulorum Eaton 1 only

9

SUMMARY OF AUDIT

LOSSES 0 GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 7

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: SEPA West

LABORATORY: East Kilbride

DATE: 19.11.96

WATER-COURSE: White Cart Water

PRIMARY ANALYST: RW

AQC ANALYST:

SITE: u/s Eaglesham STW

CODE: 96/748

SORT/AQC METHOD: Preserved

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

Caenidae 6
Caenis rivulorum Eaton

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
Chironomidae 9
Tanytarsini 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: SEPA West

LABORATORY: East Kilbride

DATE: 1.11.95

WATER-COURSE: Allt Mor Burn

PRIMARY ANALYST: SD

AQC ANALYST:

SITE: u/s Fish Farm

CODE: 95/910

SORT/AQC METHOD: Preserved

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)

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