

An audit of performance in the analysis of biological samples in 1995 NRA Severn-Trent Region: AQC Audit

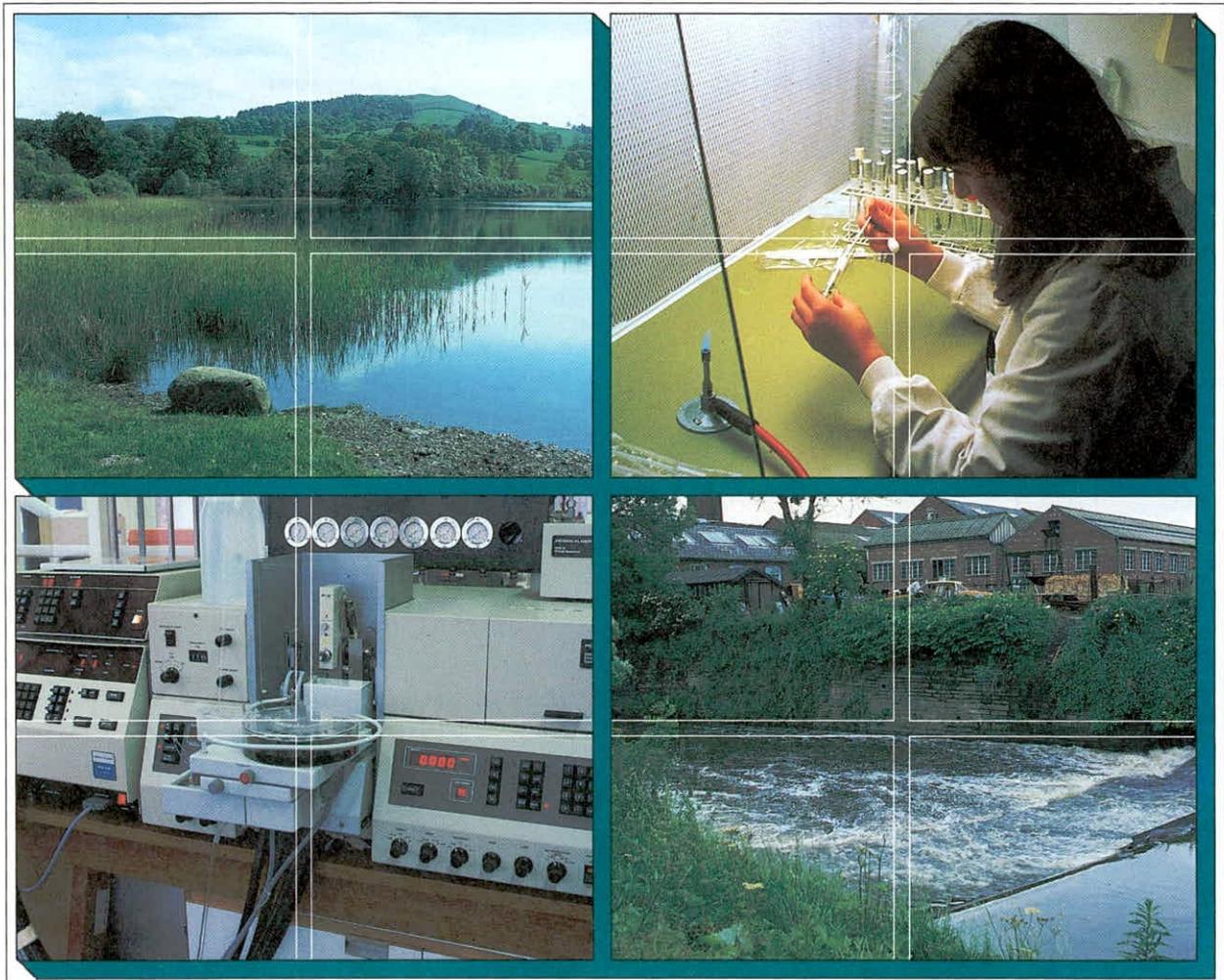
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NRA Severn-Trent Region: AQC Audit

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1. INTRODUCTION

The 1995 General Quality Assessment (GQA) Survey included the sampling of aquatic macro-invertebrates for biological assessment of river quality throughout the United Kingdom. In England and Wales the survey was undertaken by the National Rivers Authority (NRA), the River Purification Boards (RPBs) sampled in Scotland, the Industrial Research and Technology Unit (IRTU) undertook the work in Northern Ireland and the Government Laboratory covered the Isle of Man (IOM).

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

Samples were sorted for the families of macro-invertebrates included in the Biological Monitoring Working Party (BMWP) system. Taxa present were recorded on site data sheets. Although attempts had been made to standardise sample processing and recording techniques, these did vary somewhat from region to region.

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

This report presents the results of the 48 AQC'd samples audited for NRA Severn-Trent Region and represents a measure of the performance of the AQC analyst rather than that of the primary analyst. The results of the Primary Audit, detailing the performance of primary analysts for all 61 samples for the Region, are reported separately.

2. SAMPLE SELECTION

Samples for audit were selected internally by each of the agencies being monitored. The number of samples selected for audit varied between the different agencies and the biologists processing these samples had no prior knowledge of which samples were to be audited. Some agencies only sent to IFE samples that had been processed twice. Others adopted a random selection process, whereby some samples had been analysed just once and some had been re-sorted. The manner of sample selection, which biologists would be monitored and the number of audit samples from each season, were left to the discretion of the agency, within the limits of the total number of samples that IFE was contracted to audit.

3. SAMPLE PROCESSING

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

- i) a data sheet containing a list of the BMWP families found in the sample.
- ii) a vial containing representatives from each family.
- iii) the preserved sample.

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

- a) The remainder of the sample was sorted, without reference to the data sheet or to the vial of animals, and the BMWP families identified.
- b) The families contained within the vial were identified.
- c) A comparison was made between the listing of families and those found in the sample by IFE.
- d) A comparison was made between the listing of families and those identified from the vial by IFE.
- e) "Losses" or "gains" from the original listing of families were noted. In the case of "gains", each additional family was identified, where possible, to species level, in order to clarify any specific repetitive errors. Single representatives of a "gained" taxon were noted as such.
- f) An error code, selected from a list on the result sheet, was assigned by the IFE auditor for each "loss" or "gain".

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

Several directives were issued to IFE relating to the treatment of BMWP taxa. Every taxon recorded on the data sheet must be supported by a voucher specimen of that family in the vial (or, for very large specimens, left in the sample). The only exceptions to this rule were the native crayfish, *Austropotamobius pallipes*, the medicinal leech, *Hirudo medicinalis* and the pearl mussel, *Margaritifera margaritifera* (which does not belong to a BMWP family), all of which are protected species. Where possible, IFE gave the benefit of doubt to the analyst in cases of the "loss" of Planariidae, specimens of which have been known to disintegrate in preservative. Animals deemed to have been dead at the time of sampling, cast insect skins, pupal exuviae and empty mollusc shells were to be excluded from the listing of families present. Isolated posterior ends of "living" specimens were not acceptable as records of a taxon. In these cases, thorax plus abdomen was deemed acceptable but abdomen only was deemed unacceptable. Terrestrial representatives of BMWP scoring families were also to be excluded from the audit. For this reason, Clambidae, Chrysomelidae and Curculionidae, which appear in the BMWP list, were excluded for the purposes of the audit since most representatives of these families are, at best, only semi-aquatic. Trichopteran pupae, although not routinely identified by many biologists, were to be included in the listing of families.

4. REPORTING

The results of each sample audit were recorded on a standard report form and sent to the Regional Biologist. Copies of these report forms are presented in the Appendix. For audit samples where a vial of animals was included, the comparison between the listing of families and the taxa found in the vial by IFE was shown in the section of the report form headed "VIAL". Discrepancies could be due to carelessness, misidentifications or errors in completing the data sheet listing the families present. Families not on the listing but found by IFE in the remainder of the sample were entered in the section of the report form headed "SAMPLE" under "Additional BMWP taxa found by IFE". Taxa recorded here represent families missed by the analyst(s) on sorting the sample. When the families listed as "losses" in the first section of the report form were compared with the full list of families recorded in the sample by IFE, some apparent losses from the vial were offset by the presence of those families in the remainder of the sample. These taxa were therefore listed both as "losses" from the vial and as "gains" from the sample and were neither a net loss nor a net gain. In these cases, the families were marked with an asterisk in both boxes. Such errors are noted as "omissions".

Species identifications, state of development (eg adult or larval coleopterans) and the presence of a single representative of a family within the remainder of the sample were recorded in the centre section of the report form under "species name".

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

For those samples in which the vial of animals was damaged or missing, the "VIAL" sections of the report form were not applicable (N/a). Families not on the list but present in the sample were entered in the section under "SAMPLE" : "Additional taxa" as before. Families recorded on the list but not found by IFE were indicated in the section above this. If the vial of animals was retained by the sorter, entries in this box could include the sole representative of a family which was removed, a family seen at the site which escaped or was released (without mention being made on the data sheet), inaccurate identification, the wrong family box being ticked on the data sheet or the family being present in the sample but missed by IFE.

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

5. RESULTS

The results of the AQC audit for Severn-Trent Region are summarised by area in Tables 1 to 4. Table 5 displays the statistics of these regional audit results centered around the target of acceptability of no more than two missed taxa per sample. These data are presented for each analyst, for their Area laboratories and for the Region as a whole. Table 6 compares these results for each NRA Region and Area laboratory. Table 7 presents data for Severn-Trent Region for the net effects of the AQC 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 8 compares this BMWP data for each NRA Region and Area laboratory. Table 9 lists the taxa missed in sorting by Severn-Trent Region's AQC analysts in the 1995 audit and Table 10 lists all such taxa for the entire 1995 audit (Primary and AQC Audits for NRA regions and Main Audit for other organisations) for the whole of the UK.

6. ACKNOWLEDGEMENTS

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

Table 1. The 12 AQC'd samples audited for Upper Severn Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Battlefield Brook	Fockbury	ADG	0	1	0
Merryhill Brook	Bratch	ADG	0	0	0
Blakedown Brook	Viaduct	ADG	0	0	0
Blakedown Brook	u/s Blakedown WRW	ADG	1	2	0
Morda	d/s Mile Oak WRW	ADG	1	0	0
Coal Brook	Old Mill	ADG	0	0	0
AUTUMN					
Barbourne	Blackpole	ADG	0	1	0
Stour	Dog Kennel Lane	ADG	0	1	0
Stratford Brook	Wyken Wheel	ADG	1	1	0
Onny	Wistanstow	ADG	0	0	0
Kemp	u/s Minor Road Bridge	ADG	1	0	0
Tern	Longdon	ADG	0	3	0

Table 2. The 10 AQC'd samples audited for Lower Severn Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Badsey Brook	d/s Childswickham	ADC	0	0	0
Isbourne	A46 Bridge	ADC	1	4	0
Wymans Brook	d/s Pitteville Lakes	ADC	0	1	0
Hatfield Brook	Kempsey	PJB	2	0	0
Cinderford Brook	Upper Soudley	PJB	0	5	0
AUTUMN					
Frome	Beards Mill	HW	1	1	0
Leadon	New Mills	HW	0	1	0
Canley Brook	Sir Henry Parkes Road	HW	0	0	0
Itchen	Deppers Bridge	HW	0	4	1
Harvington Brook	d/s Harvington WRW	HW	0	0	0

Table 3. The 9 AQC'd samples audited for Upper Trent Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Dove	d/s Rocester	GF	0	2	0
Marchington Brook	Marchington	GF	0	1	0
Carlton Brook	Carlton Bridge	GF	0	1	0
Tame	Lea Marston	GF	0	0	0
Trent	Colwich	GF	0	0	0
AUTUMN					
Tame	Fazeley	GF	0	1	1
Chitlings Brook	Trent Vale	GF	0	1	1
Saredon Brook	Cannock	GF	0	0	0
Rough Brook	Rushall	GF	0	1	0

Table 4. The 16 AQC'd samples audited for Lower Trent Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Wood Brook	d/s Loughborough WR'	PH	1	6	0
Willow Brook	Humberstone	PH	1	0	0
Sence	Newton Harcourt	PH	0	2	0
Twyford Brook	d/s Findern WRW	PH	0	3	0
Anston Brook	B6463 Bridge	PH	0	0	0
Eye	Saxby	PH	0	1	0
Pickwell Brook	Whissendine Road Brid	PS	0	4	0
Ashop	Ashop	PS	0	3	0
South Soak Drain	Crowle Station	PS	0	1	0
AUTUMN					
Erewash	Shipleigh Gate	PS	0	0	0
Erewash	Trowell	PS	0	0	0
Amber	Buckland Hollow	PS	0	1	0
Alfreton Brook	Parkmill Drive	PS	0	1	0
Nethergreen Brook	Eastwood	PS	0	1	0
Dover Beck	Epperstone	PS	0	2	0
Cauldwell Brook	Confluence	PS	0	0	0
Ryton	Worksop	PS	0	0	0

Table 5. Statistics of 1995 AQC Audit results for Severn-Trent Region

Analyst/Group	n	Mean gains	Standard error	No.samples >2 gains	% samples >2 gains	Highest no. gains	Mean errors (l+g+o)	Standard error
Upper Severn	12	0.75	0.28	1	8.33	3	1.08	0.31
ADG	12	0.75	0.28	1	8.33	3	1.08	0.31
Lower Severn	10	1.60	0.62	3	30.00	5	2.10	0.67
ADC	3	1.67	1.20	1	33.33	4	2.00	1.53
HW	5	1.20	0.73	1	20.00	4	1.60	0.93
PJB	2	2.50	2.50	1	50.00	5	3.50	1.50
Upper Trent	9	0.78	0.22	0	0.00	2	1.00	0.29
GF	9	0.78	0.22	0	0.00	2	1.00	0.29
Lower Trent	17	1.47	0.41	4	23.53	6	1.59	0.45
PH	6	2.00	0.93	2	33.33	6	2.33	1.02
PS	11	1.18	0.40	2	18.18	4	1.18	0.40
Severn-Trent Region	48	1.19	0.21	8	16.67	6	1.46	0.23
Whole of NRA	287	0.92	0.07	36	12.54	6	1.20	0.08

Table 6. Summary of errors found in 1995 AQC Audit for each NRA Laboratory

Region/Lab.	n	Mean gains	Standard error	No.samples >2 gains	% samples >2 gains	Highest no. gains	Mean errors (l+g+o)	Standard error
Anglian	33	1.24	0.20	5	15.15	4	1.76	0.25
Central	13	1.23	0.36	2	15.38	4	2.15	0.45
Eastern	13	1.38	0.33	2	15.38	4	1.62	0.33
Northern	7	1.00	0.38	1	14.29	3	1.29	0.52
N'umb & Yorks	30	0.87	0.16	2	6.67	3	1.00	0.19
South Yorkshire	18	0.83	0.20	1	5.56	3	0.94	0.24
Northumbria	2	1.00	0.00	0	0.00	1	1.00	0.00
Dales	10	0.90	0.35	1	10.00	3	1.10	0.41
North West	42	1.19	0.22	10	23.81	6	1.48	0.23
Northern	12	0.75	0.28	1	8.33	3	1.33	0.40
Central	12	0.92	0.38	3	25.00	3	1.00	0.37
Southern	18	1.67	0.40	6	33.33	6	1.89	0.40
Severn-Trent	48	1.19	0.21	8	16.67	6	1.46	0.23
Upper Severn	12	0.75	0.28	1	8.33	3	1.08	0.31
Lower Severn	10	1.60	0.62	3	30.00	5	2.10	0.67
Upper Trent	9	0.78	0.22	0	0.00	2	1.00	0.29
Lower Trent	17	1.47	0.41	4	23.53	6	1.59	0.45
Southern	24	0.38	0.14	1	4.17	3	0.67	0.19
Western	9	0.00	0.00	0	0.00	0	0.22	0.15
Eastern	15	0.60	0.21	1	6.67	3	0.93	0.27
South Western	53	0.51	0.11	1	1.89	3	0.57	0.12
Devon	15	0.73	0.23	0	0.00	2	0.80	0.22
Cornwall	15	0.40	0.21	1	6.67	3	0.40	0.21
North Wessex	14	0.50	0.23	0	0.00	2	0.57	0.23
South Wessex	9	0.33	0.24	0	0.00	2	0.44	0.34
Thames	21	1.10	0.26	4	19.05	3	1.52	0.33
Fobney Mead	13	1.46	0.35	4	30.77	3	2.08	0.45
Waltham Cross	8	0.50	0.27	0	0.00	2	0.63	0.26
Welsh	36	0.89	0.19	5	13.89	3	1.25	0.21
Northern	12	1.50	0.34	3	25.00	3	1.83	0.34
South Western	12	0.58	0.33	2	16.67	3	0.92	0.36
South Eastern	12	0.58	0.23	0	0.00	2	1.00	0.35
Whole of NRA	287	0.92	0.07	36	12.54	6	1.20	0.08

Table 7. Net effects of the AQC Audit on BMWP score and number of scoring taxa

Analyst/Group	n	Mean net effect on BMWP score	% of 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
Upper Severn	12	2.67	8.33	21	0.42	8.33	3
ADG	12	2.67	8.33	21	0.42	8.33	3
Lower Severn	10	6.60	30.00	30	1.20	30.00	5
ADC	3	7.67	33.00	20	1.33	33.33	3
HW	5	3.80	20.00	14	1.00	20.00	4
PJB	2	12.00	50.00	30	1.50	50.00	5
Upper Trent	9	4.78	11.11	18	0.78	0.00	2
GF	9	4.78	11.11	18	0.78	0.00	2
Lower Trent	17	5.82	17.65	22	1.35	23.53	5
PH	6	6.00	16.67	22	1.67	33.33	5
PS	11	5.73	18.18	20	1.18	18.18	4
S-T Region	48	5.00	16.67	30	0.98	16.67	5
Whole of NRA	287	4.11	11.50	30	0.71	10.80	6

Table 8. Net effects of the AQC Audit on BMWP score and number of scoring taxa for each NRA Area

Analyst/Group	n	Mean net effect on BMWP score	% of 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
Anglian	33	4.42	9.09	17	0.88	12.12	4
Central	13	3.92	15.38	17	0.69	15.38	3
Eastern	13	5.46	7.69	14	1.15	15.38	4
Northern	7	3.43	0.00	8	0.71	0.00	2
N'umb & Yorks	30	4.67	3.33	25	0.80	3.30	3
South Yorkshire	18	4.28	0.00	13	0.78	5.56	3
Northumbria	2	5.00	0.00	5	1.00	0.00	1
Dales	10	5.30	10.00	25	0.80	10.00	3
North West	42	5.64	14.29	24	0.98	21.43	6
Northern	12	2.42	0.00	13	0.42	8.33	3
Central	12	6.50	25.00	24	8.33	25.00	3
Southern	18	7.22	16.67	23	1.44	27.78	6
Severn-Trent	48	5.00	16.67	30	0.98	16.67	5
Upper Severn	12	2.67	8.33	21	0.42	8.33	3
Lower Severn	10	6.60	30.00	30	1.20	30.00	5
Upper Trent	9	4.78	11.11	18	0.78	0.00	2
Lower Trent	17	5.82	17.65	22	1.35	23.53	5
Southern Region	24	0.88	0.00	12	0.08	0.00	2
Western	9	-1.22	0.00	0	-0.22	0.00	0
Eastern	15	2.13	0.00	12	0.27	0.00	2
South Western	53	2.85	11.32	22	0.45	1.89	3
Devon	15	4.07	20.00	15	0.67	0.00	2
Cornwall	15	2.20	6.67	22	0.40	6.67	3
N. Wessex	14	2.93	14.29	16	0.43	0.00	2
S. Wessex	9	1.78	0.00	10	0.22	0.00	1
Thames	21	4.19	14.29	19	0.76	14.29	3
Fobney Mead	13	5.77	23.08	19	1.00	23.08	3
Waltham Cross	8	1.63	0.00	10	0.38	0.00	2
Welsh	36	4.39	19.44	30	0.58	11.11	3
Northern	12	8.67	41.67	20	1.17	16.67	3
S. Western	12	1.92	16.67	30	0.25	16.67	3
S. Eastern	12	2.58	0.00	11	0.33	0.00	2
Whole of NRA	287	4.11	11.50	30	0.71	10.80	6

Table 9. Taxa missed by Severn-Trent Region's AQC analysts

Family	n	% of Severn-Trent Region's missed taxa in AQC Audit	% of missed taxa in AQC Audit for all NRA Regions
Simuliidae	6	11.32	3.45
Hydrobiidae (incl. Bithyniidae)	5	9.43	5.17
Hydrophilidae (incl. Hydraenidae)	5	9.43	6.47
Hydroptilidae	4	7.55	6.03
Lymnaeidae	3	5.66	2.16
Elmidae	3	5.66	5.17
Sphaeriidae	2	3.77	5.17
Asellidae	2	3.77	1.29
Tipulidae	2	3.77	3.88
Valvatidae	2	3.77	2.16
Gyrinidae	2	3.77	1.29
Leptoceridae	2	3.77	3.88
Baetidae	1	1.89	2.16
Brachycentridae	1	1.89	0.86
Dytiscidae (incl. Noteridae)	1	1.89	2.59
Rhyacophilidae (incl. Glossosomatid	1	1.89	0.43
Siphonuridae	1	1.89	0.43
Psychomyiidae (incl. Ecnomidae)	1	1.89	1.72
Planorbidae	1	1.89	1.29
Physidae	1	1.89	1.29
Nemouridae	1	1.89	3.02
Limnephilidae	1	1.89	2.16
Hydropsychidae	1	1.89	2.16
Glossiphoniidae	1	1.89	0.86
Haliplidae	1	1.89	1.29
Gammaridae (incl. Crangonyctidae)	1	1.89	1.29
Ephemerellidae	1	1.89	1.72

Table 10. Missed taxa for all samples in 1995 audit

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

Table 10. (cont.)

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

APPENDIX

Results of individual sample audits

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Severn

DATE: 6.3.95

WATER-COURSE: Battlefield Brook

PRIMARY ANALYST: LM

AQC ANALYST: ADG

SITE: Fockbury

CODE: 113813

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

Simuliidae	Simulium ornatum group (larvae + pupa)	8
------------	--	---

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 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: Severn-Trent

LABORATORY: Upper Severn

DATE: 8.3.95

WATER-COURSE: Merryhill Brook

PRIMARY ANALYST: LM

AQC ANALYST: ADG

SITE: Bratch

CODE: 113829

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Severn

DATE: 13.3.95

WATER-COURSE: Blakedown Brook

PRIMARY ANALYST: LM

AQC ANALYST: ADG

SITE: Viaduct

CODE: 113837

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent	LABORATORY: Upper Severn	DATE: 13.3.95
WATER-COURSE: Blakedown Brook	PRIMARY ANALYST: LM	AQC ANALYST: ADG
SITE: u/s Blakedown WRW	CODE: 113839	SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Rhyacophilidae (incl. Glossosomatidae)	7
--	---

Additional BMWP taxa found by IFE

Limnephilidae	7
---------------	---

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)	Potamopyrgus jenkinsi	9
---------------------------------	-----------------------	---

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 | 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: Severn-Trent

LABORATORY: Upper Severn

DATE: 6.4.95

WATER-COURSE: Morda

PRIMARY ANALYST: PW

AQC ANALYST: ADG

SITE: d/s Mile Oak WRW

CODE: 113950

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Physidae

8

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: Severn-Trent

LABORATORY: Upper Severn

DATE: 2.5.95

WATER-COURSE: Coal Brook

PRIMARY ANALYST: LM

AQC ANALYST: ADG

SITE: Old Mill

CODE: 114023

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Severn

DATE: 11.9.95

WATER-COURSE: Barbourne

PRIMARY ANALYST: PW

AQC ANALYST: ADG

SITE: Blackpole

CODE: 114413

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Gyrinidae	Orectochilus villosus (larva) 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Severn

DATE: 19.9.95

WATER-COURSE: Stour

PRIMARY ANALYST: PW

AQC ANALYST: ADG

SITE: Dog Kennel Lane

CODE: 114442

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Simuliidae

Simulium sp. 1 only

9

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent
 WATER-COURSE: Stratford Brook
 SITE: Wyken Wheel

LABORATORY: Upper Severn
 PRIMARY ANALYST: PW
 CODE: 114514

DATE: 3.10.95
 AQC ANALYST: ADG
 SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Dytiscidae (incl. Noteridae)

4

Additional BMWP taxa found by IFE

None

SAMPLE

BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

Hydroptilidae

Ithytrichia sp.

9

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: Severn-Trent

LABORATORY: Upper Severn

DATE: 16.10.95

WATER-COURSE: Onny

PRIMARY ANALYST: TPE

AQC ANALYST: ADG

SITE: Wistanstow

CODE: 114552

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

YIAL

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: Severn-Trent

LABORATORY: Upper Severn

DATE: 14.11.95

WATER-
COURSE: Kemp

PRIMARY
ANALYST: PW

AQC
ANALYST: ADG

SITE: u/s Minor Road Bridge

CODE: 114639

SORT/AQC
METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Hydropsychidae

Rhyacophila sp. (pupa) in vial. Note on
data sheet suggests that AQC checker
was uncertain about this specimen.

12

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 -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: Severn-Trent

LABORATORY: Upper Severn

DATE: 15.11.95

WATER-
COURSE: Tern

PRIMARY
ANALYST: ADG

AQC
ANALYST: ADG

SITE: Longdon

CODE: 114645

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Tipulidae	Antocha vitripennis 1 only	9
Leptoceridae	Mystacides sp. (juvenile) 1 only	9
Hydroptilidae	Hydroptila sp. (pupa) 1 only	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 21

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 13.3.95

WATER-COURSE: Badsey Brook

PRIMARY ANALYST: HWY

AQC ANALYST: ADC

SITE: d/s Childswickham

CODE: 04/3606

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Severn

DATE: 29.3.95

WATER-COURSE: Isbourne

PRIMARY ANALYST: ADC

AQC ANALYST: ADC

SITE: A46 Bridge

CODE: 137868

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Lymnaeidae	8
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Additional BMWP taxa found by IFE

Hydrobiidae (incl. Bithyniidae)	Potamopyrgus jenkinsi	8
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SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Sphaeriidae	Pisidium sp.	9
Ephemerellidae	Ephemerella ignita 1 only	9
Nemouridae	Nemoura cambrica/erratica	9

SUMMARY OF AUDIT

LOSSES 1

GAINS 4

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 3.4.95

WATER-COURSE: Wymans Brook

PRIMARY ANALYST: APH

AQC ANALYST: ADC

SITE: d/s Pitteville Lakes

CODE: 137879

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Hydrobiidae (incl. Bithyniidae)	Bithynia tentaculata	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 3

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Severn

DATE: 24.4.95

WATER-
COURSE: Hatfield Brook

PRIMARY
ANALYST: APH

AQC
ANALYST: PJB

SITE: Kempsey

CODE: 127914

SORT/AQC
METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Planorbidae		4
Hydrobiidae (incl. Bithyniidae)		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 2 GAINS 0

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 15.5.95

WATER-COURSE: Cinderford Brook

PRIMARY ANALYST: ADC

AQC ANALYST: PJB

SITE: Upper Soudley

CODE: 127954

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Rhyacophilidae (incl. Glossosomatidae)	Rhyacophila sp. (juveniles)	9
Limnephilidae	Chaetopteryx villosa 1 only	9
Hydroptilidae	Hydroptila sp.	9
Hydrophilidae (incl. Hydraenidae)	Helophorus brevipalpis (adult) 1 only	9
Elmidae	Elmis aenea (larvae)	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 5

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 30

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 7.9.95

WATER-COURSE: Frome

PRIMARY ANALYST: HW

AQC ANALYST: HW

SITE: Beards Mill

CODE: 04 2230

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Leptoceridae	Sericostoma personatum	7
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Additional BMWP taxa found by IFE

Sericostomatidae	Sericostoma personatum	7
------------------	------------------------	---

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

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 16.10.95

WATER-COURSE: Leadon

PRIMARY ANALYST: AC

AQC ANALYST: HW

SITE: New Mills

CODE: 04 2340/128427

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

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

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Severn

DATE: 21.9.95

WATER-
COURSE: Canley Brook

PRIMARY
ANALYST: HW

AQC
ANALYST: HW

SITE: Sir Henry Parkes Road

CODE: 04 3830/138372

SORT/AQC
METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Severn

DATE: 20.11.95

WATER-COURSE: Itchen

PRIMARY ANALYST: AC

AQC ANALYST: HW

SITE: Deppers Bridge

CODE: 04 3906/138543

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

Dytiscidae (incl. Noteridae) *

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

Asellidae

Asellus meridianus 1 only

9

Lymnaeidae

Lymnaea stagnalis

9

Gyrinidae

Note on data sheet "down sink"

12

Gyrinus urinator in primary vial

Dytiscidae (incl. Noteridae) *

Platambus maculatus (larva) 1 only

1

Planorbidae

Armiger crista

9

SUMMARY OF AUDIT

LOSSES 0 GAINS 4

OMISSIONS: 1

NET EFFECTS:

ON BMWP SCORE 14

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: Severn-Trent

LABORATORY: Lower Severn

DATE: 31.10.95

WATER-
COURSE: Harvington Brook

PRIMARY
ANALYST: HW

AQC
ANALYST: HW

SITE: d/s Harvington WRW

CODE: 04 3720/138479

SORT/AQC
METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0 GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Trent

DATE: 14.3.95

WATER-COURSE: Dove

PRIMARY ANALYST: CAS

AQC ANALYST: GF

SITE: d/s Rocester

CODE: 173058

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Psychomyiidae (incl. Ecnomidae)	Psychomyia pusilla 1 only	9
Brachycentridae	Brachycentrus subnubilus (pupa) 1 only	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 2

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 18
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: Severn-Trent

LABORATORY: Upper Trent

DATE: 29.3.95

WATER-COURSE: Marchington Brook

PRIMARY ANALYST: CAS

AQC ANALYST: GF

SITE: Marchington

CODE: 173080

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Haliplidae	Brychius elevatus (adult) 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Trent

DATE: 28.3.95

WATER-COURSE: Carlton Brook

PRIMARY ANALYST: REM

AQC ANALYST: GF

SITE: Carlton Bridge

CODE: 173074

SORT/AQC

METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Hydropsychidae

Hydropsyche pellucidula 1 only

9

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Trent

DATE: 25.4.95

WATER-
COURSE: Tame

PRIMARY
ANALYST: REM

AQC
ANALYST: GF

SITE: Lea Marston

CODE: 173128

SORT/AQC
METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0 GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Upper Trent

DATE: 9.5.95

WATER-COURSE: Trent

PRIMARY ANALYST: REM

AQC ANALYST: GF

SITE: Colwich

CODE: 173186

SORT/AQC METHOD: Live/Live

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent	LABORATORY: Upper Trent	DATE: 4.9.95
WATER-COURSE: Tame	PRIMARY ANALYST: CAS	AQC ANALYST: GF
SITE: Two Gates, Fazeley	CODE: 04 8810	SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

Ancyliidae (incl. Acroloxidae) *	4
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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

Ancyliidae (incl. Acroloxidae) *	Acroloxus lacustris 1 only	4
Simuliidae	Simulium erythrocephalum 1 only	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 1

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: Severn-Trent

LABORATORY: Upper Trent

DATE: 6.11.95

WATER-COURSE: Chitlings Brook

PRIMARY ANALYST: CAS

AQC ANALYST: GF

SITE: Trent Vale

CODE: 04 7241

SORT/AQC METHOD: Live/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Gammaridae (incl. Crangonyctidae) * 3

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

Helophorus grandis (adult) 1 only

Gammaridae (incl. Crangonyctidae) * 3

Gammarus pulex

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 1

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: Severn-Trent

LABORATORY: Upper Trent

DATE: 21.11.95

WATER-COURSE: Saredon Brook

PRIMARY ANALYST: CAS

AQC ANALYST: GF

SITE: Church Bridge, Cannock

CODE: 04 7015

SORT/AQC

METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

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: Severn-Trent

LABORATORY: Upper Trent

DATE: 29.11.95

WATER-COURSE: Rough Brook

PRIMARY ANALYST: REM

AQC ANALYST: GF

SITE: Rushall

CODE: 04 8776/173806

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Hydrophilidae (incl. Hydraenidae)	Helophorus brevipalpis (adult) 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 1.3.95

WATER-COURSE: Wood Brook

PRIMARY ANALYST: BF

AQC ANALYST: PH

SITE: d/s Loughborough WRW

CODE: 142788

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

Tipulidae	7
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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	Valvata piscinalis 1 only	9
Glossiphoniidae	Helobdella stagnalis	9
Hydrobiidae (incl. Bithyniidae)	Potamopyrgus jenkinsi	9
Sphaeriidae	Pisidium sp.	12
Elmidae	Elmis aenea (larva) 1 only	9
Leptoceridae	Athripsodes cinereus 1 only	9

SUMMARY OF AUDIT

LOSSES 1

GAINS 6

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 22

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 13.3.95

WATER-COURSE: Willow Brook

PRIMARY ANALYST: PH

AQC ANALYST: PH

SITE: Humberstone

CODE: 142828

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

Leptophlebiidae

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 9.4.95

WATER-COURSE: Sence

PRIMARY ANALYST: BF

AQC ANALYST: PH

SITE: Newton Harcourt

CODE: 142881

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

<u>Family name</u>	<u>Species name (where appropriate)</u>	<u>Presumed cause of error (see footnotes)</u>
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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

Baetidae	Baetis rhodani	9
Gammaridae (incl. Crangonyctidae)	Gammarus pulex 1 only	9

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 2.3.95

WATER-COURSE: Twyford Brook

PRIMARY ANALYST: PH

AQC ANALYST: PH

SITE: d/s Findern WRW

CODE: 142779

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Lymnaeidae	Lymnaea truncatula 1 only	9
Valvatidae	Valvata piscinalis 1 only	9
Hydrobiidae (incl. Bithyniidae)	Potamopyrgus jenkinsi	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 9

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: Severn-Trent

LABORATORY: Lower Trent

DATE 17.4.95

WATER-
COURSE: Anston Brook

PRIMARY
ANALYST: REM

AQC
ANALYST: PH

SITE: B6463 Bridge

CODE: 152512

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

IFE cannot verify Dendrocoelidae from
damaged remains in vial - benefit of
doubt given to NRA analyst.

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 26.4.95

WATER-COURSE: Eye

PRIMARY ANALYST: PH

AQC ANALYST: PH

SITE: Saxby

CODE: 142903

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Simuliidae	Simulium ornatum group 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5
ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 27.4.95

WATER-COURSE: Pickwell Brook

PRIMARY ANALYST: BF

AQC ANALYST: PS

SITE: Whissendine Road Bridge

CODE: 142920

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Asellidae	Asellus meridianus 1 only	9
Hydrophilidae (incl. Hydraenidae)	Hydraena sp. (adult) 1 only	9
Tipulidae	Pilaria (Pilaria) sp.	12
Simuliidae	Simulium vernal/naturale 1 only	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 4

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 18

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 10.5.95

WATER-COURSE: Ashop

PRIMARY ANALYST: PS

AQC ANALYST: PS

SITE: Ashop

CODE: 143053

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Siphonuridae	Siphonurus lacustris/armatus 1 only	9
Dytiscidae (incl. Noteridae)	Oreodytes sanmarkii (adults)	9
Simuliidae	Simulium sp. (argyreatum?)	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 20

ON NO. OF TAXA 3

1 No representative of family in vial

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 29.5.95

WATER-COURSE: South Soak Drain

PRIMARY ANALYST: PS

AQC ANALYST: PS

SITE: Crowle Station

CODE: 143118

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Lymnaeidae	Lymnaea peregra 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 3

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 11.10.95

WATER-COURSE: Erewash

PRIMARY ANALYST: LTB

AQC ANALYST: PS

SITE: Shipley Gate

CODE: 04 5304/143372

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 19.10.95

WATER-
COURSE: Erewash

PRIMARY
ANALYST: LTB

AQC
ANALYST: PS

SITE: Trowell

CODE: 04 5305/143446

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 12.10.95

WATER-COURSE: Amber

PRIMARY ANALYST: PS

AQC ANALYST: PS

SITE: Buckland Hollow

CODE: 04 5218/143393

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Hydroptilidae	Hydroptila sp. (pupae)	9
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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

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 12.10.95

WATER-COURSE: Alfretton Brook

PRIMARY ANALYST: PH

AQC ANALYST: PS

SITE: Parkmill Drive

CODE: 04 5225/143377

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Elmidae	Oulimnius sp. (larva) 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5

ON NO. OF TAXA 1

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 25.10.95

WATER-COURSE: Nethergreen Brook

PRIMARY ANALYST: LTB

AQC ANALYST: PS

SITE: Eastwood

CODE: 04 5309/143458

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Simuliidae	Simulium erythrocephalum 1 only	9
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SUMMARY OF AUDIT

LOSSES 0 GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 5
ON NO. OF TAXA 1

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 7.11.95

WATER-
COURSE: Dover Beck

PRIMARY
ANALYST: PS

AQC
ANALYST: PS

SITE: Epperstone

CODE: 04 4056/143612

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

Hydrobiidae (incl. Bithyniidae)	Potamopyrgus jenkinsi	9
Physidae	Physa sp. (juveniles)	9

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: Severn-Trent

LABORATORY: Lower Trent

DATE: 21.11.95

WATER-COURSE: Cauldwell Brook

PRIMARY ANALYST: LTB

AQC ANALYST: PS

SITE: Confluence

CODE: 04 5414/143765

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0 GAINS 0 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0
ON NO. OF TAXA 0

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Severn-Trent

LABORATORY: Lower Trent

DATE: 17.11.95

WATER-
COURSE: Ryton

PRIMARY
ANALYST: LTB

AQC
ANALYST: PS

SITE: High Hoe Road, Worksop

CODE: 04 5702

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0 GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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