



An audit of performance in the analysis of biological samples in 1995 NRA Welsh Region: AQC Audit

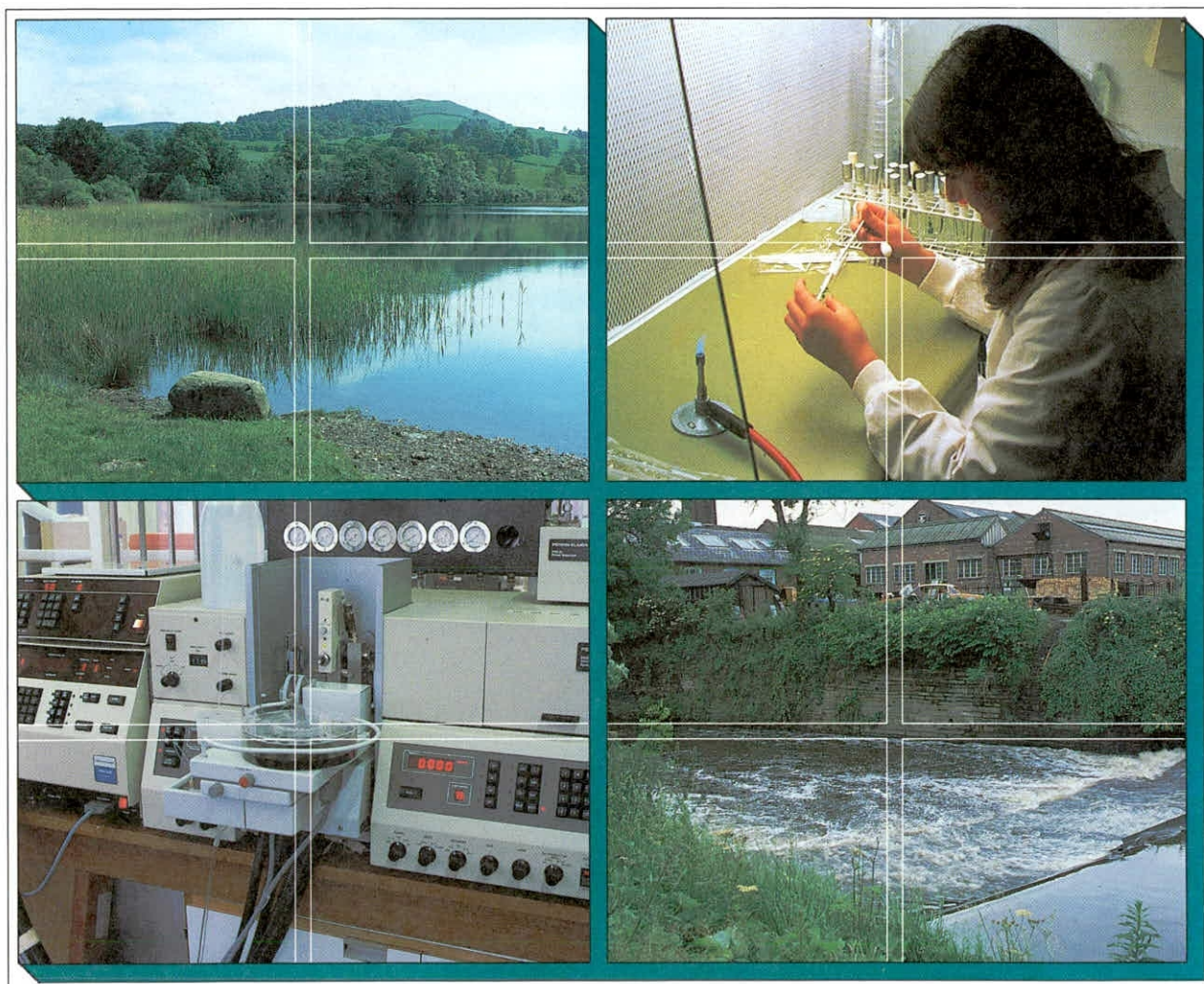
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Report To:
IFE Report Ref. No:

National Rivers Authority, Welsh Region
RL/T04071o7/16





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An audit of performance in the analysis of biological samples in 1995. NRA Welsh Region: AQC Audit

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Project Leader:
Report Date:
Report To:
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R.J.M. Gunn
June 1996
National Rivers Authority, Welsh Region
RL/T04071o7/16

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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 36 AQC'd samples audited for NRA North West 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 60 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 Welsh Region are summarised by area in Tables 1 to 3. Table 4 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 5 compares these results for each NRA Region and Area laboratory. Table 6 presents data for Welsh 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 7 compares this BMWP data for each NRA Region and Area laboratory. Table 8 lists the taxa missed in sorting by Welsh Region's AQC analysts in the 1995 audit and Table 9 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 Northern Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Alyn	Fagl Lane	JB(1)	0	0	0
Wepre Brook	Shotton	JB(1)	0	1	0
Caldy Brook	Huntington	KW	0	2	0
Ceirw	u/s Nug	MS	0	3	0
Conwy	Llanrwst	RC	0	0	0
AUTUMN					
Ebbw Fawr	Rogerstone	JB(1)	1	1	0
Cegidog	Llandrillo	JB(1)	0	2	0
Angell	Aberangell	RC	0	3	0
Afon Gwydol	Abergwydol	RC	1	3	0
Wnion	Dolgellau	RC	1	1	0
Dwyfor	Dolbenmaen	RC	0	2	0
Aldford Brook	Lea Hall	RC	1	0	0

Table 2. The 12 AQC'd samples audited for South Western Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Pibwr	Pibwrllwyd	GR	1	0	0
Teifi	Llechryd Road Bridge	GR	0	3	0
Rheidol	Lovesgrove	KJ	0	0	0
Gawr	Brynmenyn Bridge	KJ	0	0	0
Stembridge Brook	Stembridge Farm	KJ	0	0	0
AUTUMN					
Ritec	Holloway Bridge	GR	1	1	0
Amman	Glanamman	GR	0	0	0
Ystwyth	Rhydyfelin	GR	0	3	0
Clarach	d/s Caravan site STW	GR	0	0	0
Camddwr	SN 784 532	GR	0	0	0
Cresswell	u/s Bishops Bridge	GR	2	0	0
Teifi	Llanybydder Road Bridge	KJ	0	0	0

Table 3. The 12 AQC'd samples audited for South Eastern Area

River	Site	AQC Analyst	Losses	Gains	Omissions
SPRING					
Clydach	Cwm Nant-garn	SR	1	1	0
Ely	St Fagans	SR	0	0	0
Nant Dowlais	d/s Tregurnog Farm	SR	0	0	0
Ely	u/s L'Oreal	SR	0	1	0
Tresenny Brook	Grosmont	SR	1	2	0
Weycock	Cumix Bridge	SR	0	1	2
AUTUMN					
Walford Brook	Walford	DJB	0	0	0
Wellington Brook	Wellington	SR	0	0	0
Ely	Pontyclun	SR	0	2	0
Afon Llwyd	Pontnewynydd	SR	1	0	0
Usk	Llantrisant	SR	0	0	0
Taff	u/s Taffs Well	SR	0	0	0

Table 4. Statistics of 1995 AQC Audit results for Welsh 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
Northern	12	1.50	0.34	3	25.00	3	1.83	0.34
JB(1)	4	1.00	0.41	0	0.00	2	1.25	0.48
KW	1	2.00	n/a	0	0.00	2	2.00	n/a
MS	1	3.00	n/a	1	100.00	3	3.00	n/a
RC	6	1.50	0.56	2	33.33	3	2.00	0.58
S.Western	12	0.58	0.33	2	16.67	3	0.92	0.36
GR	8	0.88	0.48	2	25.00	3	1.38	0.46
KJ	4	0.00	0.00	0	0.00	0	0.00	0.00
S.Eastern	12	0.58	0.23	0	0.00	2	1.00	0.35
DJB	1	0.00	n/a	0	0.00	0	0.00	n/a
SR	11	0.64	0.24	0	0.00	2	1.09	0.37
Welsh Region	36	0.89	0.19	5	13.89	3	1.25	0.21
Whole of NRA	287	0.92	0.07	36	12.54	6	1.20	0.08

Table 5. 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 6. 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
Northern	12	8.67	41.67	20	1.17	16.67	3
JB(1)	4	6.50	25.00	18	0.75	0.00	2
KW	1	10.00	0.00	10	2.00	0.00	2
MS	1	20.00	100.00	20	3.00	100.00	3
RC	6	8.00	50.00	18	1.00	16.67	3
S.Western	12	1.92	16.67	30	0.25	16.67	3
GR	8	2.88	25.00	30	0.38	25.00	3
KJ	4	0.00	0.00	0	0.00	0.00	0
S.Eastern	12	2.58	0.00	11	0.33	0.00	2
DJB	1	0.00	0.00	0	0.00	0.00	0
SR	11	2.82	0.00	11	0.36	0.00	2
Welsh Region	36	4.39	19.44	30	0.58	11.11	3
Whole of NRA	287	4.11	11.50	30	0.71	10.80	6

Table 7. 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 8. Taxa missed by Welsh Region's AQC analysts

Family	n	% of Welsh Region's missed taxa in AQC Audit	% of missed taxa in AQC Audit for all NRA Regions
Hydrophilidae (incl. Hydraenidae)	2	7.69	6.47
Polycentropodidae	2	7.69	3.02
Nemouridae	2	7.69	3.02
Hydroptilidae	2	7.69	6.03
Dytiscidae (incl. Noteridae)	2	7.69	2.59
Perlidae	1	3.85	0.86
Scirtidae	1	3.85	1.72
Psychomyiidae (incl. Ecnomidae)	1	3.85	1.72
Sphaeriidae	1	3.85	5.17
Planariidae (incl. Dugesiidae)	1	3.85	5.17
Piscicolidae	1	3.85	1.72
Leptophlebiidae	1	3.85	1.29
Perlodidae	1	3.85	0.43
Elmidae	1	3.85	5.17
Odontoceridae	1	3.85	0.86
Asellidae	1	3.85	1.29
Dendrocoelidae	1	3.85	1.72
Dryopidae	1	3.85	0.43
Goeridae	1	3.85	1.29
Gammaridae (incl. Crangonyctidae)	1	3.85	1.29
Philopotamidae	1	3.85	0.43

Table 9. Missed taxa for all samples in 1995 audit

Family	n	% of all missed taxa in 1995 audit
Hydrophilidae (incl. Hydraenidae)	68	5.97
Hydroptilidae	59	5.18
Sphaeriidae	52	4.57
Hydrobiidae (incl. Bithyniidae)	50	4.39
Planariidae (incl. Dugesiidae)	46	4.04
Caenidae	40	3.51
Elmidae	39	3.42
Leptoceridae	39	3.42
Psychomyiidae (incl. Ecnomidae)	39	3.42
Lymnaeidae	33	2.90
Simuliidae	32	2.81
Nemouridae	31	2.72
Limnephilidae	30	2.63
Planorbidae	29	2.55
Halplidae	28	2.46
Tipulidae	25	2.19
Baetidae	23	2.02
Glossiphoniidae	22	1.93
Goeridae	22	1.93
Leptophlebiidae	22	1.93
Dytiscidae (incl. Noteridae)	21	1.84
Ephemerellidae	20	1.76
Valvatidae	20	1.76
Hydropsychidae	18	1.58
Ancylidae (incl. Acroloxidae)	16	1.40
Asellidae	16	1.40
Leuctridae	16	1.40
Piscicolidae	16	1.40
Rhyacophilidae (incl. Glossosomatidae)	16	1.40
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 9. (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: Welsh

LABORATORY: Northern

DATE: 10.5.95

WATER-
COURSE: Alyn

PRIMARY
ANALYST: MS

AQC
ANALYST: JB

SITE: Fagl Lane

CODE: 08/N133/01

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: Welsh

LABORATORY: Northern

DATE: 4.5.95

WATER-
COURSE: Wepre Brook

PRIMARY
ANALYST: JL

AQC
ANALYST: JB(1)

SITE: Shotton

CODE: 08 N208

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

Nemouridae

Nemoura cambrica/erratica 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: Welsh

LABORATORY: Northern

DATE: 11.5.95

WATER-
COURSE: Caldý Brook

PRIMARY
ANALYST: RC

AQC
ANALYST: KW

SITE: Huntington

CODE: N250-9547

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

Dendrocoelidae	Dendrocoelum lacteum 1 only	9
Hydrophilidae (incl. Hydraenidae)	Helophorus grandis (adult) 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: Welsh	LABORATORY: Northern	DATE: 20.4.95
WATER- COURSE: Ceirw	PRIMARY ANALYST: JB	AQC ANALYST: MS
SITE: u/s Nug	CODE: 08/N187/01	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

<u>BMWP taxa not found by IFE</u>	(For samples where vial is broken or absent)	
N/a		
<u>Additional BMWP taxa found by IFE</u>		
Hydroptilidae	Ithytrichia sp.	9
Polycentropodidae	Polycentropus sp. 1 only	9
Nemouridae	Amphinemura standfussi 1 only	9

SUMMARY OF AUDIT

LOSSES 0	GAINS 3	OMISSIONS: 0	NET EFFECTS:
			ON BMWP SCORE 20
			ON NO. OF TAXA 3
1 No representative of family in vial	5 Specimen dead at time of sampling	9 Taxon missed in sorting	
2 Alternative terrestrial specimen in vial	6 Taxon in vial but not recorded	10 Unexplained error	
3 Posterior end only in vial	7 Mis-identification	11 Taxon added in internal AQC	
4 Empty shell or case or cast skin in vial	8 Typographical error - wrong box ticked	12 Recorded taxon that was rejected by AQC analyst	

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: Northern

DATE: 13.4.95

WATER-
COURSE: Conwy

PRIMARY
ANALYST: MS

AQC
ANALYST: RC

SITE: Llanrwst

CODE: 08/N071/01

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: Welsh	LABORATORY: Northern	DATE: 18.10.95
WATER- COURSE: Ebbw Fawr	PRIMARY ANALYST: HW	AQC ANALYST: JB(1)
SITE: Rogerstone	CODE: 08 E215	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

Hydroptilidae	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

Polycentropodidae	Polycentropus sp. (juvenile) 1 only	9
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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: Welsh	LABORATORY: Northern	DATE: 12.9.95
WATER-COURSE: Cegidog	PRIMARY ANALYST: RC	AQC ANALYST: JB(1)
SITE: Llandrillo	CODE: N193-9533	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

Leptophlebiidae	Paraleptophlebia submarginata 1 only	9
Philopotamidae	Wormaldia sp.	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	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: Welsh
WATER-
COURSE: Angell

LABORATORY: Northern
PRIMARY
ANALYST: JB(1)

DATE: 5.9.95
AQC
ANALYST: RC
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

Gammaridae (incl. Crangonyctidae)	Gammarus pulex	9
Planariidae (incl. Dugesiiidae)	Crenobia alpina	9
Dytiscidae (incl. Noteridae)	Oreodytes sanmarkii (larva) 1 only	9

SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 16

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: Welsh

LABORATORY: Northern

DATE: 5.9.95

WATER-

PRIMARY

AQC

COURSE: Afon Gwydol

ANALYST: JL

ANALYST: RC

SITE: Abergwydol

CODE: 08 N013

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

Planorbidae	Zonitidae in vial	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

Dryopidae	Helichus substriatus (adult) 1 only	9
Scirtidae	Elodes sp. (larvae)	9
Perlodidae	Indet Perlodid (juvenile) 1 only	9

SUMMARY OF AUDIT

LOSSES 1

GAINS 3

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: Welsh

LABORATORY: Northern

DATE: 6.9.95

WATER-
COURSE: Wnion

PRIMARY
ANALYST: KW

AQC
ANALYST: RC

SITE: Dolgellau

CODE: N028-9529

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

Corophiidae	Gammarus pulex	8
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Additional BMWP taxa found by IFE

Gammaridae (incl. Crangonyctidae)	Gammarus pulex	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

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: Welsh	LABORATORY: Northern	DATE: 12.9.95
WATER-COURSE: Dwyfor	PRIMARY ANALYST: KW	AQC ANALYST: RC
SITE: Dolbenmaen	CODE: N219-9535	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

Perlodidae	Perlodes microcephala 1 only	6
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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

Psychomyiidae (incl. Ecnomidae)	Lype sp. 1 only	9
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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	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: Welsh

LABORATORY: Northern

DATE: 18.9.95

WATER-

COURSE: Aldford Brook

PRIMARY

ANALYST: JB(2)

AQC

ANALYST: RC

SITE: Lea Hall

CODE: N252-9539

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

Lymnaeidae

Succineidae

7

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

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: Welsh

LABORATORY: South Western

DATE: 27.4.95

WATER-
COURSE: Pibwr

PRIMARY
ANALYST: KJ

AQC
ANALYST: GR

SITE: Pibwrllwyd

CODE: W142

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

Ancylidae (incl. Acroloxidae)

1

Additional BMWP taxa found by IFE

None

SAMPLE

BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 1

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -6

ON NO. OF TAXA -1

1 No representative of family in vial

5 Specimen dead at time of sampling

9 Taxon missed in sorting

2 Alternative terrestrial specimen in vial

6 Taxon in vial but not recorded

10 Unexplained error

3 Posterior end only in vial

7 Mis-identification

11 Taxon added in internal AQC

4 Empty shell or case or cast skin in vial

8 Typographical error - wrong box ticked

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: South Western

DATE: 21.4.95

WATER-
COURSE: Teifi

PRIMARY
ANALYST: JG

AQC
ANALYST: GR

SITE: Llechryd Road Bridge

CODE: W212-95SW13

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

Chloroperlidae	Chloroperla torrentium	12
Leptoceridae	Athripsodes albifrons	12

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 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 30
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: Welsh

LABORATORY: South Western

DATE: 4.4.95

WATER-
COURSE: Rheidol

PRIMARY
ANALYST: JG

AQC
ANALYST: KJ

SITE: Lovesgrove

CODE: W264

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: Welsh

WATER-COURSE: Gawr

SITE: Brynmenyn Bridge

LABORATORY: South Western

PRIMARY ANALYST: GR

CODE: W025

DATE: 2.5.95

AQC ANALYST: KJ

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: Welsh

LABORATORY: South Western

DATE: 26.4.95

WATER-
COURSE: Stembridge Brook

PRIMARY
ANALYST: GR

AQC
ANALYST: KJ

SITE: Stembridge Farm

CODE: 08 W303

SORT/AQC

METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: South Western

DATE: 9.10.95

WATER-
COURSE: Ritec

PRIMARY
ANALYST: CD

AQC
ANALYST: GR

SITE: Holloway Bridge

CODE: W188-95SW25

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

Perlidae 5

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. (pupa) 1 only 9

SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -4

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: South Western

DATE: 8.10.95

WATER-

PRIMARY

AQC

COURSE: Amman

ANALYST: SL

ANALYST: GR

SITE: Glanamman

CODE: 08 W102

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: Welsh
WATER-
COURSE: Ystwyth

LABORATORY: South Western
PRIMARY
ANALYST: JG

DATE: 13.9.95
AQC
ANALYST: GR
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

Scirtidae	Hydrocyphon deflexicollis (larva) 1 only	6
Lymnaeidae	Lymnaea sp. (juvenile) 1 only	6

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

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

LOSSES 0 GAINS 3 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 13
ON NO. OF TAXA 3

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: Northern

DATE: 12.9.95

WATER-
COURSE: Dwyfor

PRIMARY
ANALYST: KW

AQC
ANALYST: RC

SITE: Dolbenmaen

CODE: N219-9535

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

Perlodidae	Perlodes microcephala 1 only	6
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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

Psychomyiidae (incl. Ecnomidae)	Lype sp. 1 only	9
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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: Welsh

LABORATORY: Northern

DATE: 18.9.95

WATER- .

PRIMARY

AQC

COURSE: Aldford Brook

ANALYST: JB(2)

ANALYST: RC

SITE: Lea Hall

CODE: N252-9539

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

Lymnaeidae

Succineidae

7

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: Welsh	LABORATORY: South Western	DATE: 27.4.95
WATER-COURSE: Pibwr	PRIMARY ANALYST: KJ	AQC ANALYST: GR
SITE: Pibwrllwyd	CODE: W142	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

Ancylidae (incl. Acroloxidae)

1

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 1 GAINS 0 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -6
ON NO. OF TAXA -1

- 1 No representative of family in vial
- 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: Welsh

LABORATORY: South Western

DATE: 21.4.95

WATER-
COURSE: Teifi

PRIMARY
ANALYST: JG

AQC
ANALYST: GR

SITE: Llechryd Road Bridge

CODE: W212-95SW13

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

Chloroperlidae	Chloroperla torrentium	12
Leptoceridae	Athripsodes albifrons	12

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 1 only	9
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SUMMARY OF AUDIT

LOSSES 0

GAINS 3

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 30
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: Welsh
WATER-
COURSE: Rheidol

LABORATORY: South Western
PRIMARY
ANALYST: JG

DATE: 4.4.95
AQC
ANALYST: KJ
SORT/AQC
METHOD: Preserved/Preserved

SITE: Lovesgrove

CODE: W264

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: Welsh

LABORATORY: South Western

DATE: 2.5.95

WATER-

PRIMARY

AQC

COURSE: Gawr

ANALYST: GR

ANALYST: KJ

SITE: Brynmenyn Bridge

CODE: W025

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

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: Welsh

LABORATORY: South Western

DATE: 26.4.95

WATER-
COURSE: Stembridge Brook

PRIMARY
ANALYST: GR

AQC
ANALYST: KJ

SITE: Stembridge Farm

CODE: 08 W303

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: Welsh

LABORATORY: South Western

DATE: 9.10.95

WATER-
COURSE: Ritec

PRIMARY
ANALYST: CD

AQC
ANALYST: GR

SITE: Holloway Bridge

CODE: W188-95SW25

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

Perlidae 5

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. (pupa) 1 only 9

SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE -4

ON NO. OF TAXA 0

1 No representative of family in vial

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: Welsh

LABORATORY: South Western

DATE: 8.10.95

WATER-

PRIMARY

AQC

COURSE: Amman

ANALYST: SL

ANALYST: GR

SITE: Glanamman

CODE: 08 W102

SORT/AQC

METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh
WATER-
COURSE: Ystwyth

LABORATORY: South Western
PRIMARY
ANALYST: JG

DATE: 13.9.95
AQC
ANALYST: GR
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

Scirtidae	Hydrocyphon deflexicollis (larva) 1 only	6
Lymnaeidae	Lymnaea sp. (juvenile) 1 only	6

SAMPLE

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

N/a

Additional BMWP taxa found by IFE

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

LOSSES 0 GAINS 3 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 13
ON NO. OF TAXA 3

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

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

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

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: South Western

DATE: 13.9.95

WATER-
COURSE: Clarach

PRIMARY
ANALYST: JG

AQC
ANALYST: GR

SITE: d/s Caravan site STW

CODE: 08 W424

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: Welsh

LABORATORY: South Western

DATE: 2.10.95

WATER-
COURSE: Camddwr

PRIMARY
ANALYST: KJ

AQC
ANALYST: GR

SITE: SN 784 532

CODE: W186-95SW48

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: Welsh

LABORATORY: South Western

DATE: 9.10.95

WATER-
COURSE: Cresswell

PRIMARY
ANALYST: CD

AQC
ANALYST: GR

SITE: u/s Bishops Bridge

CODE: W414-95SW51

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

Planorbidae	2
Caenidae	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 -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: Welsh

WATER-COURSE: Teifi

SITE: Llanybydder Road Bridge

LABORATORY: South Western

PRIMARY ANALYST: JG

CODE: W391-95SW49

DATE: 6.9.95

AQC ANALYST: KJ

SORT/AQC METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

VIAL

BMWP taxa not found by IFE

None

Additional BMWP taxa found by IFE

None

SAMPLE

BMWP taxa not found by IFE

(For samples where vial is broken or absent)

N/a

Additional BMWP taxa found by IFE

None

SUMMARY OF AUDIT

LOSSES 0

GAINS 0

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 0

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

LABORATORY: South Eastern

DATE: 1.5.95

WATER-
COURSE: Clydach

PRIMARY
ANALYST: MC

AQC
ANALYST: SR

SITE: Cwm Nant-garn

CODE: 08/E199/01

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

Planorbidae	Zonitidae in AQC vial	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

Elmidae	Elmis aenea (larvae), Linnius volckmari Esolus parallelepipedus (adults)	9
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SUMMARY OF AUDIT

LOSSES 1

GAINS 1

OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 2

ON NO. OF TAXA 0

1 No representative of family in vial

2 Alternative terrestrial specimen in vial

3 Posterior end only in vial

4 Empty shell or case or cast skin in vial

5 Specimen dead at time of sampling

6 Taxon in vial but not recorded

7 Mis-identification

8 Typographical error - wrong box ticked

9 Taxon missed in sorting

10 Unexplained error

11 Taxon added in internal AQC

12 Recorded taxon that was rejected by AQC analyst

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

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES

REGION: Welsh

WATER-
COURSE: Ely

SITE: St Fagans

LABORATORY: South Eastern

PRIMARY
ANALYST: CM

CODE: 08/E324/01

DATE: 10.5.95

AQC
ANALYST: SR

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: Welsh

LABORATORY: South Eastern

DATE: 10.5.95

WATER-
COURSE: Nant Dowlais

PRIMARY
ANALYST: CM

AQC
ANALYST: SR

SITE: d/s Tregurnog Farm

CODE: 08/E445/01

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: Welsh

LABORATORY: South Eastern

DATE: 19.4.95

WATER-
COURSE: Ely

PRIMARY
ANALYST: CM

AQC
ANALYST: SR

SITE: u/s L'Oreal

CODE: 08/E330/01

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

Dytiscidae (incl. Noteridae)	Oreodytes sanmarkii (adults)	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: Welsh	LABORATORY: South Eastern	DATE: 3.5.95
WATER-COURSE: Tresenny Brook	PRIMARY ANALYST: MC	AQC ANALYST: SR
SITE: Grosmont	CODE: 08 E400	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

Planorbidae	AQC column of data sheet marked "terrestrial?" but taxon still included by AQC checker in assessing BMWP score	2
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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

Piscicolidae	Piscicola geometra 1 only	9
Odontoceridae	Odontocerum albicorne	9

SUMMARY OF AUDIT

LOSSES 1 GAINS 2 OMISSIONS: 0

NET EFFECTS:

ON BMWP SCORE 11
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: Welsh

LABORATORY: South Eastern

DATE: 23.3.95

WATER-
COURSE: Weycock

PRIMARY
ANALYST: DJB

AQC
ANALYST: SR

SITE: Cumix Bridge

CODE: E451-021

SORT/AQC
METHOD: Preserved/Preserved

RESULTS OF MAIN AUDIT

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

BMWP taxa not found by IFE

Hydrobiidae (incl. Bithyniidae) *	4
Sphaeriidae *	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

Goeridae	Goera pilosa 1 only	9
Hydrobiidae (incl. Bithyniidae) *	Potamopyrgus jenkinsi	4
Sphaeriidae *	Pisidium sp.	4

SUMMARY OF AUDIT

LOSSES 0

GAINS 1

OMISSIONS: 2

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: Welsh

LABORATORY: South Eastern

DATE: 4.9.95

WATER-
COURSE: Walford Brook

PRIMARY
ANALYST: SR

AQC
ANALYST: DJB

SITE: Walford

CODE: E050-041

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: Welsh

LABORATORY: South Eastern

DATE: 7.9.95

WATER-

PRIMARY

AQC

COURSE: Wellington Brook

ANALYST: DJB

ANALYST: SR

SITE: Wellington

CODE: 08 E085

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: Welsh

LABORATORY: South Eastern

DATE: 19.9.95

WATER-

PRIMARY

AQC

COURSE: Ely

ANALYST: DJB

ANALYST: SR

SITE: Pontyclun

CODE: 08 E329

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

Sphaeriidae	Pisidium sp.	9
Asellidae	Asellus aquaticus 1 only	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: Welsh

LABORATORY: South Eastern

DATE: 16.10.95

WATER-
COURSE: Afon Llwyd

PRIMARY
ANALYST: MGC

AQC
ANALYST: SR

SITE: Pontnewynydd

CODE: 08 E181

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

Physidae

Succineidae in vial

7

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: Welsh	LABORATORY: South Eastern	DATE: 25.9.95
WATER-COURSE: Usk	PRIMARY ANALYST: SE	AQC ANALYST: SR
SITE: Llantrisant	CODE: E167-030	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: Welsh

LABORATORY: South Eastern

DATE: 21.9.95

WATER-
COURSE: Taff

PRIMARY
ANALYST: IH

AQC
ANALYST: SR

SITE: u/s Taffs Well

CODE: E269-035

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

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)

