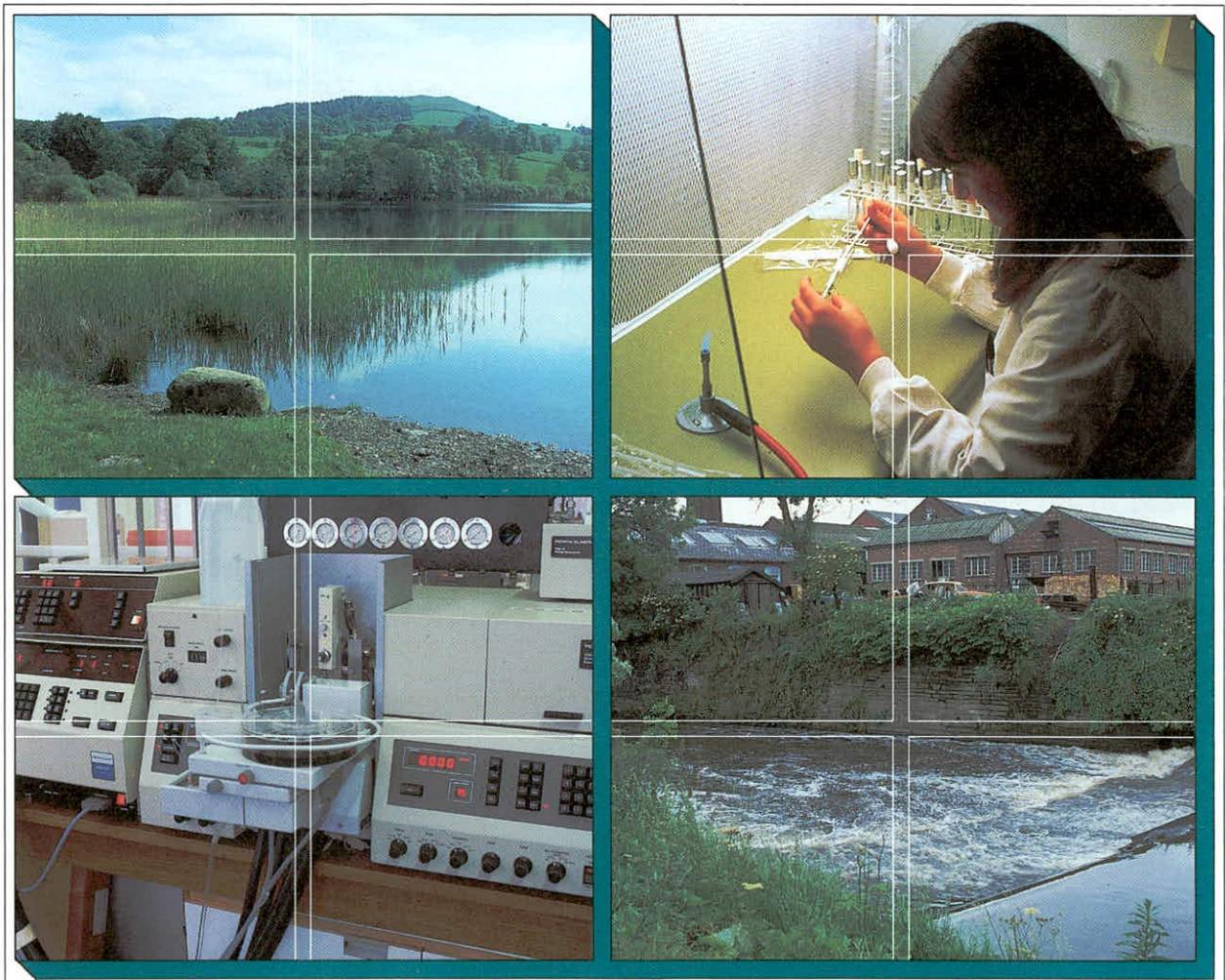


An audit of performance in the processing of macro-invertebrate samples in 1993. Northern Ireland

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Northern Ireland**

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The Institute of Freshwater Ecology is part of the Terrestrial and Freshwater Sciences Directorate of the Natural Environment Research Council.

1. INTRODUCTION

In 1993 the sampling of aquatic macro-invertebrates for the biological assessment of river quality continued throughout the United Kingdom. This task was undertaken by the National Rivers Authority (NRA) in England and Wales, the River Purification Boards (RPBs) in Scotland and the Industrial Research & Technology Unit (IRTU) in Northern Ireland.

In view of the number of staff involved and the variability of sample processing techniques, it was recognised that an independent quality control exercise was necessary to promote a consistently high level of reliability. The IFE was contracted to undertake an audit of the sample sorting and identification performance of each NRA region, several RPBs and the IRTU. This report presents the results of 60 samples audited for Northern Ireland. The IFE was not required to perform any statistical analyses nor interpretation of the results of the audit.

Each organisation employed standard collection procedures, as used in the 1990 River Quality Survey, and the sampling strategy was therefore compatible with RIVPACS (River InVertebrate Prediction And Classification System), which has been developed by the Institute of Freshwater Ecology (IFE).

Samples were sorted by NRA, RPB and IRTU personnel for the families of macro-invertebrates included in the Biological Monitoring Working Party (BMWP) system. Taxa present were recorded on site data sheets. Sample processing and recording techniques varied from region to region.

2. SAMPLE SELECTION

Samples for audit were selected internally by each of the agencies being monitored. The biologists processing these samples had no prior knowledge of the samples to be audited.

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

- i) a 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 and the BMWP families listed
- b) The families contained within the vial were identified and listed
- c) A comparison was made between the IRTU listing of families and those identified from the vial by IFE
- d) A comparison was made between the IRTU listing of families and those found in the sample by IFE
- e) "Losses" or "gains" from the IRTU 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.

For a number of different reasons, some samples did not include a vial containing representative examples of the families listed on the data sheet. Others arrived with the vial damaged in transit such that the representative examples were no longer separated. For these samples, only operations a), d) and e) above were appropriate.

Several directives were issued to IFE relating to the treatment of BMWP taxa. Terrestrial representatives of BMWP scoring families, animals deemed to have been dead at the time of sampling, cast insect skins, pupal exuviae, empty mollusc shells and posterior ends of "living" specimens were to be excluded from the listing of families present. Chrysomelidae and Curculionidae, which appear in the BMWP list, were also to be excluded for the purposes of the audit. 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 (Table 1). For audit samples where a vial of animals was included, the comparison between the IRTU listing and the taxa found in the vial by IFE was shown in box A of the report form. Discrepancies could be due to carelessness, misidentifications or errors in completing the IRTU data sheet. Families not on the IRTU listing but found by IFE in the remainder of the sample were entered in box B of the report form under "additional families". When the families listed as "losses" in section A 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 in the "losses" box of section A and the "gains" box of section B 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" in the tables which summarise the results for each season (Tables 2, 3 and 4).

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 notes section of the report form. Where the IRTU data sheet indicated that a family was noted and released at the site, this was recorded in the notes section but not included as a "loss", even though the family was not found in the vial.

For those samples in which the vial of animals was damaged or missing, box A of the report form was not applicable (N/a). Families not on the list but present in the sample were entered in box B under "additional families" as before. Families recorded on the list but not found by IFE were indicated on the left hand side of box B. Where 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.

Results of the audits of individual samples are presented in the Appendix.

ACKNOWLEDGEMENTS

Thanks to Diana Morton for typing the report.

TABLE 1. The IFE Report form

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION RIVER

DATE SITE

SORTER SAMPLE CODE

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE		

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	

NOTES: NET LOSSES NET GAINS

TABLE 2. The 20 spring samples audited for Northern Ireland

River	Site	Sorter	Losses	Gains	Omissions
Blackwater	The Moy	AHB	1	7	1
*Upper Bann	Ballydown	CAK	1	0	0
Tall	Clonmore Bridge	AHB	1	1	0
Tall	Drumard	AHB	0	2	0
Upper Bann	Milltown	CAK	0	3	1
Ravernet	Sprucefield	CAK	0	0	1
Ravernet	Legacurry	MJO	1	2	0
Upper Bann	Gilford	PRH	0	0	0
Upper Bann	Banbridge	MJO	0	3	0
Lackey	Knockballymore	IO'N	1	3	0
Callan	Derryscallop	PRH	1	0	0
Ballinamallard	Ballycassidy Bridge	IO'N	0	4	0
Blackwater	Benburb	IO'N	0	2	0
Woodford	Aghalane	IO'N	1	0	0
Glemaan	Cushendall	CAK	1	1	1
*Lagan	Lisburn	MJO	1	3	0
*Rhone	Clonteevy	PRH	2	1	0
Tall	Darbys Bridge	AHB	0	1	0
Upper Bann	Katesbridge	MJO	2	1	0
Blackwater	Bonds Bridge	PRH	1	1	0

*indicates lid separated from vial in transit

TABLE 3. The 15 summer samples audited for Northern Ireland

River	Site	Sorter	Losses	Gains	Omissions
Cloghfin	Black Hill	PRH	1	1	0
Upper Bann	Ballydown	MJO	0	3	1
Owenreagh	Ballynahatty Bridge	MJO	0	5	0
Blackwater	Benburb	PRH	0	0	0
Rhone	Clonteevy	IO'N	0	1	0
Camowen	Ramackan Bridge	AHB	1	2	1
Blackwater	Bonds Bridge	MJO	0	1	0
Killyclougher Burn	Lovers Retreat	CAK	0	1	0
Callan	Derryscallop	IO'N	0	3	0
Strule	Abbey Bridge	PRH	0	3	0
Drumragh	Campsie Bridge	PRH	0	0	1
Quiggery Water	Edergoole Bridge	MJO	0	0	0
Ardilea	A2 Bridge	IO'N	1	0	0
Killyclougher Burn	Killyclougher	CAK	0	1	0
Tall	Redmonds Bridge	IO'N	0	0	0

TABLE 4. The 25 autumn samples audited for Northern Ireland

River	Site	Sorter	Losses	Gains	Omissions
Dervock	Iderown Bridge	AHB	2	1	0
Bush	Ballyhoe Bridge	AHB	1	4	0
Woodburn	Coutalds Factory	CAK	0	3	0
Glynn	Glynn	AHB	1	5	1
Kilroot	Kilroot	CAK	0	2	0
Lough McNea River	Belcoo	PRH	1	1	0
Camowen	Donnelly's Bridge	MJO	0	0	0
Strule	Abbey Bridge	IO'N	0	0	0
Callan	Papermill Bridge	MJO	0	0	0
Oona Water	Oona Water Bridge	MJO	0	0	0
Ballygawley	Lismore Bridge	CAK	0	0	1
Tall	Drumard	CAK	0	2	0
Owenkillew	Killymore Bridge	PRH	0	0	0
Aughrim	Kilkeel	MJO	1	0	2
Blackwater	Burns Bridge	CAK	0	2	0
Burren	Baileys Bridge	CAK	0	2	0
Blackwater	Benburb	MJO	0	2	0
Upper Bann	Ballydown	IO'N	0	1	0
Blackstaff	Tullymurry Bridge	IO'N	0	1	1
Lackey	Knockballymore	PRH	1	2	0
Finn	Clady Bridge	PRH	0	0	0
Tall	Darby's Bridge	IO'N	0	1	0
Tynan	A28 Bridge	CAK	3	0	0
Blackwater	Caledon Bridge	PRH	0	2	0
Shimna	Tullymore Forest	IO'N	0	1	0

APPENDIX

Results of individual sample audits

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	19.5.93	SITE	The Moy
SORTER	AHB	SAMPLE CODE	NRA11 0056

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Elmidae* 2 Phryganeidae	3 Ephemerellidae 4 Notonectidae 5 Polycentropodidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	6 Valvatidae 7 Sphaeriidae 8 Baetidae 9 Hydrophilidae 10 Elmidae*

NET LOSSES 1

NET GAINS 7

NOTES:

- 1,10 Terrestrial beetle (Scolytidae?) in vial, Elmis aenea (larva)
- 1 only in sample
- 3 Ephemerella ignita
- 4 Notonecta glauca
- 5 Polycentropus flavomaculatus
- 6 Valvata piscinalis 1 only
- 7 Pisidium sp. 1 only
- 8 Centroptilum luteolum 1 only
- 9 Indet Hydrophilid (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N. Ireland	RIVER	Upper Bann
DATE	29.4.93	SITE	Ballydown
SORTER	CAK	SAMPLE CODE	NRA11 0050

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	Lid separated from vial in transit. Identification check not possible.	N/a

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample) 1 Ephemerellidae	None

NET LOSSES

NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	19.5.93	SITE	Clonmore Bridge
SORTER	AHB	SAMPLE CODE	NRA11 0067

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Lymnaeidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Ancylidae

NET LOSSES

NET GAINS

NOTES:

1 Succinea sp. in vial
2 Acroloxus lacustris

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	24.5.93	SITE	Drumard
SORTER	AHB	SAMPLE CODE	NRA11 0070

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Valvatidae 2 Hydrobiidae

NET LOSSES NET GAINS

NOTES:

1 Valvata piscinalis
2 Potamopyrgus jenkinsi

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Upper Bann
DATE	29.4.93	SITE	Milltown
SORTER	CAK	SAMPLE CODE	NRA11 0284

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Caenidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Hydrobiidae 3 Caenidae* 4 Haliplidae 5 Elmidae

NET LOSSES 0

NET GAINS 3

NOTES:

2 Potamopyrgus jenkinsi 1 only 3 Caenis luctuosa/macrura 4 Brychius elevatus (adult) 1 only 5 Elmis aenea (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Ravernet
DATE	29.4.93	SITE	Sprucefield
SORTER	CAK	SAMPLE CODE	NRA11 0101

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Dytiscidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Dytiscidae*

NET LOSSES 0 NET GAINS 0

NOTES:

2 Potamonectes depressus, Oreodytes sanmarkii (adults)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Ravernet
DATE	28.4.93	SITE	Legacurry
SORTER	MJO	SAMPLE CODE	NRA11 0212

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Tipulidae	2 Caenidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	3 Hydrophilidae

NET LOSSES 1

NET GAINS 2

NOTES:

1 Limnophora sp. (Muscidae) puparium in vial
2 Caenis luctuosa/macrura
3 Hydraena gracilis (adults)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Upper Bann
DATE	29.4.93	SITE	Gilford
SORTER	PRH	SAMPLE CODE	NRA11 0283

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Upper Bann
DATE	29.4.93	SITE	Solitude Park, Banbridge
SORTER	MJO	SAMPLE CODE	NRA11 0286

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	1 Planorbidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Dendrocoelidae 3 Psychomyiidae

NET LOSSES 0 NET GAINS 3

NOTES:

1 Bathymphalus contortus in vial, Gyraulus albus in sample
2 Dendrocoelum lacteum 1 only
3 Psychomyia pusilla, Tinodes waeneri

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Lackey
DATE	26.5.93	SITE	Knockballymore
SORTER	IO'N	SAMPLE CODE	NRA11 0158

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Linnephilidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Planorbidae 3 Asellidae 4 Leptophlebiidae

NET LOSSES 1 NET GAINS 3

NOTES:

2 Armiger crista 1 only
3 Asellus aquaticus 1 only
4 Indet Leptophlebiid 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Callan
DATE	19.5.93	SITE	Derryscallop
SORTER	PRH	SAMPLE CODE	NRA11 0059

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Lymnaeidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES 1 NET GAINS 0

NOTES:

1 Succinea sp. in vial

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N. Ireland	RIVER	Ballinamallard
DATE	27.5.93	SITE	Ballycassidy Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0129

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	1 Sphaeriidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Asellidae 3 Hydrophilidae 4 Leptoceridae

NET LOSSES 0 NET GAINS 4

NOTES:

- 1 Pisidium sp.
- 2 Asellus aquaticus 1 only
- 3 Helophorus brevipalpis (adult) 1 only
- 4 Athripsodes albifrons

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	24.5.93	SITE	Benburb
SORTER	IO'N	SAMPLE CODE	NRA11 0249

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Asellidae 2 Psychomyiidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Asellus aquaticus 1 only
2 Psychomyia pusilla 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Woodford
DATE	25.5.93	SITE	Aghalane
SORTER	IO'N	SAMPLE CODE	NRA11 0160

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Phryganeidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Glenaan
DATE	4.5.93	SITE	Cushendall
SORTER	CAK	SAMPLE CODE	NRA11 0190

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Dytiscidae* 2 Leptoceridae	3 Sericostomatidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	4 Dytiscidae*

NET LOSSES 1 NET GAINS 1

NOTES:

3 Sericostoma personatum
4 Oreodytes sanmarkii (adults)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Lagan
DATE	28.4.93	SITE	Lisburn
SORTER	MJO	SAMPLE CODE	NRA11 0097

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	Lid separated from vial in transit. Identification check not possible.	N/a

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample) 1 Piscicolidae	2 Lymnaeidae 3 Ancylidae 4 Elmidae

NET LOSSES 1

NET GAINS 3

NOTES:

2 Lymnaea peregra
3 Acroloxus lacustris
4 Elmis aenea (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Rhone
DATE	19.5.93	SITE	Clonteevy
SORTER	PRH	SAMPLE CODE	NRA11 0061

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	Lid separated from vial in transit. Identification check not possible.	N/a

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample) 1 Planariidae 2 Dytiscidae	3 Dendrocoelidae

NET LOSSES 2

NET GAINS 1

NOTES:

3 Dendrocoelum lacteum

Posterior end of Hydrophilid larva found by IFE in sample. Does not count for purposes of this audit.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	24.5.93	SITE	Darbys Bridge
SORTER	AHB	SAMPLE CODE	NRA11 0071

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Sphaeriidae

NET LOSSES 0

NET GAINS 1

NOTES:

1 Pisidium sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N. Ireland	RIVER	Upper Bann
DATE	29.4.93	SITE	Katesbridge
SORTER	MJO	SAMPLE CODE	NRA11 0287

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Rhyacophilidae 2 Tipulidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	3 Lepidostomatidae

NET LOSSES 2 NET GAINS 1

NOTES:

3 Lepidostoma hirtum 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	19.5.93	SITE	Bonds Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0065

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydrophilidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Gyrinidae

NET LOSSES 1

NET GAINS 1

NOTES:

1 Terrestrial larva in vial
2 Gyrinus sp. (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Cloghfin
DATE	8.7.93	SITE	Black Hill
SORTER	PRH	SAMPLE CODE	NRA11 0208

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydroptilidae	2 Glossiphoniidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES 1 NET GAINS 1

NOTES:

2 Helobdella stagnalis

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Upper Bann
DATE	4.8.93	SITE	Ballydown
SORTER	MJO	SAMPLE CODE	NRA11 0050

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Limnephilidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Corixidae 3 Psychomyiidae 4 Limnephilidae* 5 Goeridae

NET LOSSES 0 NET GAINS 3

NOTES:

2 Indet Corixid (nymph) 1 only
3 Psychomyia pusilla 1 only
4 Limnephilus sp. (juveniles)
5 Goera pilosa 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Owenreagh
DATE	8.7.93	SITE	Ballynahatty Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0017

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Planariidae 2 Calopterygidae 3 Gerridae 4 Hydrophilidae 5 Tipulidae

NET LOSSES 0 NET GAINS 5

NOTES:

- 1 Polycelis nigra/tenuis 1 only
- 2 Calopteryx splendens 1 only
- 3 Gerris lacustris 1 only
- 4 Hydraena gracilis (adult) 1 only
- 5 Dicranota sp. 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	5.8.93	SITE	Benburb
SORTER	PRH	SAMPLE CODE	NRA11 0249

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES 0 NET GAINS 0

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Rhone
DATE	5.8.93	SITE	Clonteevy
SORTER	IO'N	SAMPLE CODE	NRA11 0061

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Planariidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Polycelis nigra/tenuis 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Camowen
DATE	8.7.93	SITE	Ramackan Bridge
SORTER	AHB	SAMPLE CODE	NRA11 0259

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Tipulidae* 2 Oligochaeta	3 Simuliidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	4 Caenidae 5 Tipulidae*

NET LOSSES NET GAINS

NOTES:

3 Simulium ornatum group (larvae + pupa), S.reptans (larva)
 4 Caenis luctuosa/macrura
 5 Dicranota sp.

Note on data sheet that Ancyliidae "noted on site - not in tube".
 Empty shells only found by IFE in vial and sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	3.8.93	SITE	Bonds Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0065

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Glossiphoniidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Helobdella stagnalis

Unionidae and Dytiscidae marked on data sheet. Comments relating to these taxa are illegible but it is assumed that they were recorded at the time of sampling.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Killyclougher Burn
DATE	8.7.93	SITE	Lovers Retreat
SORTER	CAK	SAMPLE CODE	NRA11 0200

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Baetidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 Baetis rhodani

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Callan
DATE	3.8.93	SITE	Derryscallop
SORTER	IO'N	SAMPLE CODE	NRA11 0059

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Erpobdellidae 2 Psychomyiidae 3 Simuliidae

NET LOSSES 0

NET GAINS 3

NOTES:

1 Erpobdella octoculata
2 Lype sp. 1 only
3 Simulium erythrocephalum (pupa) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Strule
DATE	8.7.93	SITE	Abbey Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0012

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Dytiscidae 2 Limnephilidae 3 Tipulidae

NET LOSSES NET GAINS

NOTES:

1 Oreodytes sp. (larva) 1 only
 2 Indet Limnephilid (juvenile) 1 only
 3 Dicranota sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Drumragh
DATE	8.7.93	SITE	Campsie Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0015

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydroptilidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Hydroptilidae*

NET LOSSES 0 NET GAINS 0

NOTES:

2 Hydroptila sp., Ithytrichia sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Quiggery Water
DATE	8.7.93	SITE	Edergoole Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0016

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Ardilea
DATE	2.8.93	SITE	A2 Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0236

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydrobiidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES 1 NET GAINS 0

NOTES:

1 Empty shells in vial
Vial contained a decomposing Athripsodes. Not included as a "gain".

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Killyclougher Burn
DATE	8.7.93	SITE	Killyclougher
SORTER	CAK	SAMPLE CODE	NRA11 0258

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	1 Polycentropodidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES

NET GAINS

NOTES:

1 Plectrocnemia sp.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	4.8.93	SITE	Redmond's Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0069

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Dervock
DATE	23.8.93	SITE	Iderown Bridge
SORTER	AHB	SAMPLE CODE	NRA11 0093

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Piscicolidae 2 Hydroptilidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	3 Lymnaeidae

NET LOSSES 2

NET GAINS 1

NOTES:

2 Note on data sheet says "pupa in case". Separate vial labelled "?? Hydroptilidae" contained a Hydroptila case and the shrivelled posterior end of a Simuliid.
3 Lymnaea sp. 1 only

Note on data sheet that Rhyacophilidae "noted in field not in tube". Not found by IFE in vial or sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Bush
DATE	23.8.93	SITE	Ballyhoe Bridge
SORTER	AHB	SAMPLE CODE	NRA11 0264

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Leptophlebiidae	2 Hydrobiidae 3 Ancylidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	4 Caenidae 5 Limnephilidae

NET LOSSES 1 NET GAINS 4

NOTES:

- 2 Potamopyrgus jenkinsi
- 3 Ancylus fluviatilis
- 4 Caenis rivulorum
- 5 Indet Limnephilid (juvenile) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N. Ireland	RIVER	Woodburn
DATE	17.8.93	SITE	Coutalds Factory
SORTER	CAK	SAMPLE CODE	NRA11 0214

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Lymnaeidae 2 Sphaeriidae 3 Elmidae

NET LOSSES 0 NET GAINS 3

NOTES:

- 1 Lymnaea peregra, L. truncatula
- 2 Pisidium sp. 1 only
- 3 Elmis aenea (larva) 1 only

Note on data sheet that Heptageniidae "noted on site". Not found by IFE in vial or sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Glynn
DATE	17.8.93	SITE	Glynn
SORTER	AHB	SAMPLE CODE	NRA11 0217

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Ancyliidae* 2 Polycentropodidae	3 Hydropsychidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	4 Ancyliidae* 5 Asellidae 6 Caenidae 7 Leuctridae 8 Hydrophilidae

NET LOSSES 1

NET GAINS 5

NOTES:

- 3 Hydropsyche pellucidula
- 4 Ancyus fluviatilis
- 5 Asellus meridianus 1 only
- 6 Caenis rivulorum
- 7 Leuctra fusca 1 only
- 8 Hydraena riparia (adult) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Kilroot
DATE	17.8.93	SITE	Kilroot
SORTER	CAK	SAMPLE CODE	NRA11 0216

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Sphaeriidae 2 Limnephilidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Pisidium sp. 1 only
2 Indet Limnephilid (juvenile) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Lough McNea
DATE	2.11.93	SITE	Belcoo
SORTER	PRH	SAMPLE CODE	NRA11 0291

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Psychomyiidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Planariidae

NET LOSSES 1

NET GAINS 1

NOTES:

2 Polycelis nigra/tenuis 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Camowen
DATE	19.10.93	SITE	Donnelly's Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0014

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Strule
DATE	19.10.93	SITE	Abbey Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0012

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Callan
DATE	11.10.93	SITE	Papermill Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0064

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Oona Water
DATE	14.10.93	SITE	Oona Water Bridge
SORTER	MJO	SAMPLE CODE	NRA11 0060

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Ballygawley
DATE	14.10.93	SITE	Lismore Bridge
SORTER	CAK	SAMPLE CODE	NRA11 0230

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Rhyacophilidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Rhyacophilidae*

NET LOSSES NET GAINS

NOTES:

1,2 Decaying pupa in vial, Rhyacophila sp.(juvenile) 1 only in sample

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	18.10.93	SITE	Drumard
SORTER	CAK	SAMPLE CODE	NRA11 0070

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Dendrocoelidae 2 Hydrophilidae

NET LOSSES 0

NET GAINS 2

NOTES:

1 Dendrocoelum lacteum 1 only
2 Hydraena riparia (adult) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Owenkillew
DATE	26.10.93	SITE	Killymore Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0008

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Aughrim
DATE	21.10.93	SITE	Kilkeel
SORTER	MJO	SAMPLE CODE	NRA11 0232

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Oligochaeta* 2 Leptoceridae 3 Chironomidae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	4 Oligochaeta* 5 Chironomidae*

NET LOSSES 1

NET GAINS 0

NOTES:

3,5 Indet Ceratopogonid in vial, Diamesinae, Orthocladiinae in sample
4 Indet Tubificidae

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	14.10.93	SITE	Burns Bridge
SORTER	CAK	SAMPLE CODE	NRA11 0229

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Polycentropodidae 2 Hydroptilidae

NET LOSSES

NET GAINS

NOTES:

1 Polycentropus flavomaculatus 1 only
2 Hydroptila sp. 1 only

Note on data sheet that Astacidae "not in tube". Not found by IFE in vial or sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Burren
DATE	21.10.93	SITE	Baileys Bridge
SORTER	CAK	SAMPLE CODE	NRA11 0239

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Hydrobiidae 2 Planorbidae

NET LOSSES 0

NET GAINS 2

NOTES:

1 Potamopyrgus jenkinsi
2 Bathyomphalus contortus 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N. Ireland	RIVER	Blackwater
DATE	14.10.93	SITE	Benburb
SORTER	MJO	SAMPLE CODE	NRA11 0249

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Polycentropodidae 2 Leptoceridae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Polycentropus flavomaculatus 1 only
2 Athripsodes cinereus, A.albifrons/bilineatus

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Upper Bann
DATE	21.10.93	SITE	Ballydown
SORTER	IO'N	SAMPLE CODE	NRA11 0050

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Polycentropodidae

NET LOSSES 0

NET GAINS 1

NOTES:

1 Polycentropus flavomaculatus 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackstaff
DATE	21.10.93	SITE	Tullymurry Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0235

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Leptoceridae*	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	2 Haliplidae 3 Leptoceridae*

NET LOSSES

NET GAINS

NOTES:

2 Haliplus sp. (larvae)
3 Athripsodes aterrimus 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Lackey
DATE	31.10.93	SITE	Knockballymore
SORTER	PRH	SAMPLE CODE	NRA11 0158

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Hydrophilidae	2 Caenidae

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	3 Hydropsychidae

NET LOSSES 1 NET GAINS 2

NOTES:

2 Caenis rivulorum
3 Hydropsyche angustipennis 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Finn
DATE	27.10.93	SITE	Clady Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0003

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES NET GAINS

NOTES:

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tall
DATE	11.10.93	SITE	Darby's Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0071

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE .

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Hydrophilidae

NET LOSSES NET GAINS

NOTES:

1 Hydraena gracilis (adults)

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Tynan
DATE	14.10.93	SITE	A28 Bridge
SORTER	CAK	SAMPLE CODE	NRA11 0231

AQC OF BMWP FAMILIES A. IN VIAL B. IN SAMPLE

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	1 Sphaeriidae 2 Rhyacophilidae 3 Tipulidae	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	None

NET LOSSES 3 NET GAINS 0

NOTES:

1 Empty shell in vial
Note on data sheet that Astacidae "noted & released". Not found by IFE in vial or sample.

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Blackwater
DATE	14.10.93	SITE	Caledon Bridge
SORTER	PRH	SAMPLE CODE	NRA11 0057

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Leuctridae 2 Gyrinidae

NET LOSSES 0 NET GAINS 2

NOTES:

1 Leuctra inermis 1 only
2 Orectochilus villosus (larva) 1 only

EXTERNAL AUDIT OF BIOLOGICAL SAMPLES - 1993

REGION	N.Ireland	RIVER	Shimna
DATE	21.10.93	SITE	Tullymore Forest
SORTER	IO'N	SAMPLE CODE	NRA11 0240

AQC OF BMWP FAMILIES A. IN VIAL + B. IN SAMPLE +

A	VIAL	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES FOUND BY IFE
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	None	None

B	SAMPLE	BMWP FAMILIES NOT FOUND BY IFE	ADDITIONAL FAMILIES
	Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	(This box only completed when no vial is supplied with sample)	1 Lepidostomatidae

NET LOSSES 0 NET GAINS 1

NOTES:

1 *Lepidostoma hirtum*

10/10/00