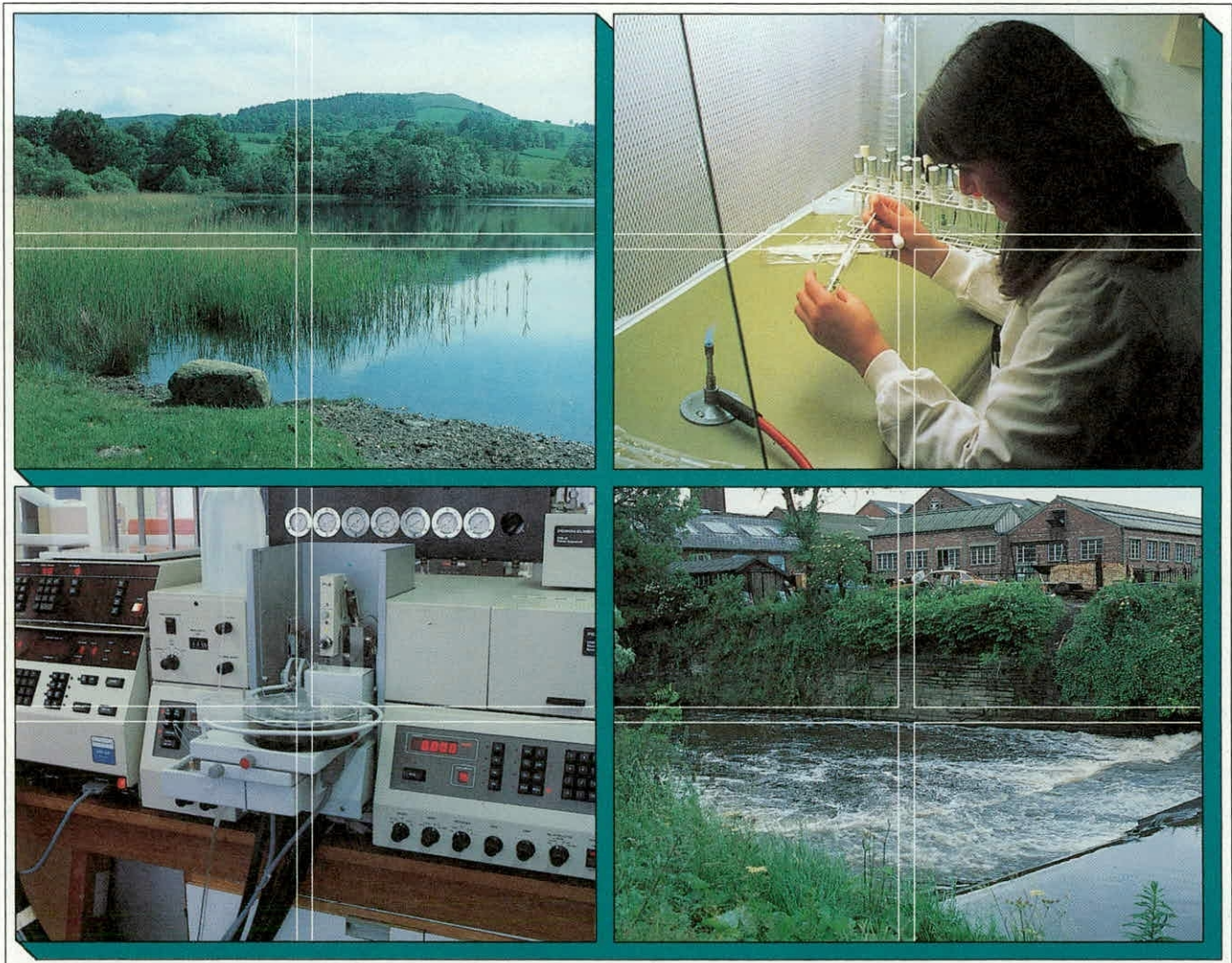




**Institute of
Freshwater
Ecology**

Quality audit of biological samples for the 1990 River Quality Survey Northern Ireland

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for the 1990 River Quality Survey
Northern Ireland**

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1. INTRODUCTION

The 1990 River Quality 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 and the Department of Economic Development (DED) undertook the work in Northern Ireland.

Approximately 7750 sites were surveyed, the majority of which were sampled in spring, summer and autumn. Standard collection procedures were used and the sampling strategy was compatible with RIVPACS (River InVertebrate Prediction And Classification System), which has been developed by the Institute of Freshwater Ecology (IFE). Most of the remaining sites were sampled in a single season only, in order to extend the scope of the survey. For a variety of reasons, a few locations were sampled in just two seasons.

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. Sample processing and recording techniques varied from region to region.

In order to undertake this massive programme of fieldwork and sample processing, a large number of new staff 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 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, RPB and the DED. This report collates the results of 34 samples audited for Northern Ireland. The IFE was not required to perform any statistical analyses nor interpretation of the results of the audit.

2. SAMPLE SELECTION

Nearly all samples from the 1990 River Quality Survey were sent to IFE for storage. They were catalogued on arrival and placed in crates, such that individual samples were readily accessible. A stratified random selection of samples for each sample processor was then made. Selection was undertaken by IFE staff and no selection was made before each sample had been received by IFE. Thus, sample processors had no means of knowing which of their samples would be audited.

The total number of sample processors employed nationally during the survey was considerably higher than that anticipated at the outset. As a consequence, the number of samples audited per processor was limited by the need to keep within the contracted overall total of 700 samples. A minimum of 4 samples was audited per processor, except where individuals processed very few samples or did not process material from each of the 3 seasons.

Sample selection was weighted towards spring samples in order to give early feedback on the blindspots of particular sorters and problems of identification.

3. SAMPLE PROCESSING

Biologists processing samples for the 1990 Survey were instructed to sort their samples, ideally within the laboratory, and 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 selection 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 DED listing of families and those identified from the vial by IFE
- d) A comparison was made between the DED listing of families and those found in the sample by IFE
- e) "Losses" or "gains" from the DED 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 DED data sheet. These samples were avoided for audit, where possible. When selection of such samples was unavoidable (eg where a particular sorter would otherwise have been excluded from the audit exercise), 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 tail ends of "living" specimens were to be excluded from the listing of families present. 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 DED 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 DED data sheet. Families not on the DED 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 table which summarises the results for each season (Table 2).

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 DED 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 which did not contain a vial of animals, box A of the report form was not applicable (N/a). Families not on the DED list but present in the sample were listed in box B under "additional families" as before. Families recorded on the DED list but not found by IFE were indicated on the left hand side of box B. If the vial of animals was retained by the DED, entries in this box could include the sole representative of a family which was removed by the DED, a family seen at the site which escaped or was released (without mention being made on the DED data sheet), inaccurate identification, the wrong family box being ticked on the DED data sheet or the family being present in the sample but missed by IFE.

Results of the audits of individual samples are presented in Table 3.

ACKNOWLEDGEMENTS

Thanks to Mrs Jessica Winder and Mrs Kay Symes for assistance with cataloguing and storage of samples and Mrs Valerie Palmer for typing the manuscript.

TABLE 1. The IFE Report form

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION RIVER

SEASON SITE

SORTER SAMPLE CODE

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	

NET LOSSES NET GAINS

NOTES

TABLE 2. The 34 samples audited for Northern Ireland, with sample sorter initials and numbers of taxa 'lost', 'gained' and 'omitted'

River	Site	Sorter	Losses	Gains	Omissions
SPRING					
Camowen	Donnellys Bridge	PRH	0	1	1
Ballynahinch	D/s Ballynahinch STW	ION	0	3	0
Erne	Rosscor Viaduct	ION	1	5	0
Sillees	Sillees	ION	1	4	0
Finn	Lackey	PRH	0	2	0
Ballycassidy	Trillick Trib	PRH	0	2	0
Bannagh	Bannagh	ION	0	2	0
Ballybay	Obins St, Portadown	CC	0	1	1
Bannagh	Drumnagreshial	ION	0	0	1
Cusher	Knock Bridge	PRH	1	1	0
Blackwater (Ards)	Ballymartin Rd Br	PRH	0	1	0
Lagan	Lisburn	PRH	0	2	1
Lagan	Shaws Bridge	CC	0	2	0
Lagan	Drum Bridge	CC	0	2	0
Blackwater	Verners Bridge	ION	0	2	0
SUMMER					
Carey	Careymill Bridge	ION	0	1	0
Crumlin	Airport Rd Br	CK/PRH	0	6	0
Lower Bann	Portglenone	PRH	0	5	0
Clanrye	Crown Bridge	PRH	0	1	0
Bannagh	Bannagh	PRH	0	2	0
Callan	Allistragh	ION	2	2	0
Sillees	Sillees	ION	0	2	0
Lagan	Lisburn	CK/PRH	0	3	0
Bessbrooke	Millvale Bridge	CK/PRH	0	4	0
Curly	Artikelly Bridge	CC/PRH	0	5	0
Upper Bann	Huntly	CC/PRH	0	4	0
Blackwater (Ards)	Ballymartin Rd Br	CC/PRH	0	4	0
AUTUMN					
Six Mile Water	Castle Farm Bridge	PRH	0	1	0
Kesh	Glendurragh	PRH	0	3	1
Upper Bann	Hilltown	ION	0	0	0
Woodford	Woodford	ION	0	0	0
Lagan	Lisburn	CK	0	2	0
Ravernet	Sprucefield	CK	0	4	0
Lagan	Youngs Bridge	CK	0	2	0

TABLE 3

Results of individual sample audits

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Camowen
SEASON	Spring		SITE	Donnelly's Bridge
SORTER	PRH		SAMPLE CODE	NRA110014

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

		LOSSES	GAINS
A	<u>VIAL</u>	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*	2 Beraeidae
B	<u>SAMPLE</u>	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 supplied with sample)	3 Leptoceridae*

NET LOSSES NET GAINS

NOTES

2 Beraeodes minutus
3 Athripsodes sp. (2 spp.)

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Ballynahinch
SEASON	Spring		SITE	D/s Ballynahinch STW
SORTER	ION		SAMPLE CODE	NRA110111

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

		LOSSES	GAINS
A	<u>VIAL</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None	ADDITIONAL FAMILIES FOUND BY IFE None
B	<u>SAMPLE</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 1 Sphaeriidae 2 Taeniopterygidae 3 Nemouridae

NET LOSSES NET GAINS

NOTES

2 Brachyptera risi
3 Amphinemura sulcicollis

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Erne
SEASON	Spring		SITE	Rosscor Viaduct
SORTER	ION		SAMPLE CODE	110122

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

		LOSSES	GAINS
A	<u>VIAL</u>	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 Dendrocoelidae	None
B	<u>SAMPLE</u>	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 supplied with sample)	2 Planariidae 3 Hydrobiidae 4 Ephemeridae 5 Elmidae 6 Hydroptilidae

NET LOSSES NET GAINS

NOTES

- 2 Polycelissp. (large)
- 3 Bithynia tentaculata
- 4 Ephemera sp. (abdomen only)
- 5 Limnius volckmari (larva)

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland		RIVER	Sillees
SEASON	Spring		SITE	Sillees
SORTER	ION		SAMPLE CODE	NRA110165

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

		LOSSES	GAINS
A	<u>VIAL</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE 1 Siphonuridae	ADDITIONAL FAMILIES FOUND BY IFE 2 Hydroptilidae 3 Leptoceridae

B	<u>SAMPLE</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 4 Planorbidae 5 Taeniopterygidae
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NET LOSSES NET GAINS

NOTES

2 Hydroptila sp., Ithytrichia sp.
 3 Athripsodes sp.
 4 Bathyomphalus contortus
 5 Brachyptera risi

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Finn
SEASON	Spring		SITE	Lackey
SORTER	PRH		SAMPLE CODE	NRA110157

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

		LOSSES	GAINS
A	<u>VIAL</u>	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 <i>Limnephilidae</i>

B	<u>SAMPLE</u>	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 supplied with sample)	2 <i>Simuliidae</i>

NET LOSSES NET GAINS

NOTES

1 Indet juvenile
2 *Simulium aureum* group

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Ballycassidy
SEASON	Spring		SITE	Trillick Trib.
SORTER	PRH		SAMPLE CODE	NRA110148

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Hydrobiidae 2 Tipulidae

NET LOSSES 0 NET GAINS 2

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Bannagh
SEASON	Spring		SITE	Bannagh
SORTER	ION		SAMPLE CODE	NRA110137

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Hydroptilidae 2 Goeridae

NET LOSSES

NET GAINS

NOTES	1 Hydroptila sp. 2 Silo pallipes
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1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Ballybay
SEASON	Spring		SITE	Obins St, Portadown
SORTER	CC		SAMPLE CODE	NRA110054

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	2 Hydrophilidae* 3 Limnephilidae

NET LOSSES NET GAINS

NOTES

2 Helophorus brevivalpis
3 Limnephilus sp. (lunatus?)

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Bannagh
SEASON	Spring	SITE	Drumnagreshial
SORTER	ION	SAMPLE CODE	NRA110138

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

		LOSSES	GAINS
A	<u>VIAL</u>	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 Heptageniidae*	None

B	<u>SAMPLE</u>	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 supplied with sample)	2 Heptageniidae*

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland		RIVER	Cusher
SEASON	Spring		SITE	Knock Bridge
SORTER	PRH		SAMPLE CODE	NRA110052

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

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

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

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Blackwater (Ards)
SEASON	Spring		SITE	Ballymartin Rd Br
SORTER	PRH		SAMPLE CODE	NRA110113

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Haliplidae

NET LOSSES NET GAINS

NOTES

1 Brychius elevatus (adult)

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland	RIVER	Lagan
SEASON	Spring	SITE	Lisburn
SORTER	PRH	SAMPLE CODE	NRA110097

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

		LOSSES	GAINS
A	<p style="text-align: center;"><u>VIAL</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p>1 Planariidae*</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p>None</p>
B	<p style="text-align: center;"><u>SAMPLE</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p>(This box only completed when no vial supplied with sample)</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p>2 Planariidae* 3 Valvatidae 4 Corixidae</p>

NET LOSSES NET GAINS

NOTES

2 Polycelis nigra/tenuis
 3 Valvata piscinalis
 4 Sigara dorsalis/striata

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Lagan
SEASON	Spring	SITE	Shaws Bridge
SORTER	CC	SAMPLE CODE	NRA110095

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	2 Lymnaeidae

NET LOSSES NET GAINS

NOTES 2 Lymnaea peregra

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland		RIVER	Lagan
SEASON	Spring		SITE	Drum Bridge
SORTER	CC		SAMPLE CODE	NRA110104

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Hydrophilidae 2 Hydropsychidae

NET LOSSES NET GAINS

NOTES

1 Helophorus brevipalpis (adult)
2 Hydropsyche siltalai

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Blackwater
SEASON	Spring	SITE	Verners Bridge
SORTER	ION	SAMPLE CODE	NRA110055

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Caenidae 2 Gerridae

NET LOSSES

NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Carey
SEASON	Summer	SITE	Careymill Bridge
SORTER	IO'N	SAMPLE CODE	NRA11 0192

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Tipulidae

NET LOSSES NET GAINS

NOTES 1 Dicranota sp. 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Crumlin
SEASON	Summer	SITE	Airport Road Bridge
SORTER	CK/PRH	SAMPLE CODE	NRA11 0185

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Lymnaeidae 2 Sphaeriidae 3 Glossiphoniidae 4 Ephemerellidae 5 Haliplidae 6 Tipulidae

NET LOSSES

NET GAINS

NOTES	1 Lymnaea peregra 2 Pisidium sp. 3 Glossiphonia complanata 1 only 4 Ephemerella ignita 1 only 5 Haliplus wehnckeii, H. lineatocollis 6 Dicranota sp. 1 only
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1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Lower Bann
SEASON	Summer	SITE	Portglenone
SORTER	PRII	SAMPLE CODE	NRA11 0080

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Hydrobiidae 2 Haliplidae 3 Polycentropodidae 4 Hydroptilidae 5 Leptoceridae

NET LOSSES

NET GAINS

NOTES

- 1 Bithynia tentaculata 1 only
- 2 Haliplus confinis, H. fluviatilis (adults + larva)
- 3 Polycentropus flavomaculatus 1 only
- 4 Agraylea multipunctata (no case)
- 5 Athripsodes aterrimus, Mystacides azurea

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION <input style="width: 100%;" type="text" value="N.Ireland"/>	RIVER <input style="width: 100%;" type="text" value="Clanrye"/>
SEASON <input style="width: 100%;" type="text" value="Summer"/>	SITE <input style="width: 100%;" type="text" value="Crown Bridge"/>
SORTER <input style="width: 100%;" type="text" value="PRH"/>	SAMPLE CODE <input style="width: 100%;" type="text" value="NRA11 0118"/>

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

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

B <u>SAMPLE</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 1 Gerridae
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NET LOSSES NET GAINS

NOTES 1 Indet Gerrid nymph 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Bannagh
SEASON	Summer	SITE	Bannagh/Drumnagalliagh
SORTER	PRH	SAMPLE CODE	NRA11 0137

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Sphaeriidae 2 Tipulidae

NET LOSSES

NET GAINS

NOTES

1 Pisidium sp. 1 only
2 Dicranota sp. 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Callan
SEASON	Summer	SITE	Allistragh
SORTER	IO'N	SAMPLE CODE	NRA11 0072

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

		LOSSES	GAINS
A	<u>VIAL</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE 1 Ephemerellidae 2 Curculionidae	ADDITIONAL FAMILIES FOUND BY IFE 3 Caenidae
B	<u>SAMPLE</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 4 Physidae

NET LOSSES

NET GAINS

NOTES 2 Terrestrial Hemipteran in vial
 4 Physa fontinalis 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Sillees
SEASON	Summer	SITE	Sillees/Derrygonnelly
SORTER	IO'N	SAMPLE CODE	NRA11 0165

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Planorbidae 2 Lepidostomatidae

NET LOSSES

NET GAINS

NOTES

1 Armiger crista, Bathymphalus contortus
2 Lepidostoma hirtum (pupa) 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Lagan
SEASON	Summer	SITE	Lisburn
SORTER	CK/PRH	SAMPLE CODE	NRA11 0097

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

		LOSSES	GAINS
A	<p style="text-align: center;"><u>VIAL</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p style="text-align: center; font-size: 1.2em;">None</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p style="text-align: center; font-size: 1.2em;">1 Haliplidae</p>
B	<p style="text-align: center;"><u>SAMPLE</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p>(This box only completed when no vial supplied with sample)</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p style="text-align: center; font-size: 1.2em;">2 Dytiscidae 3 Elmidae</p>

NET LOSSES NET GAINS

NOTES

2 Potamonectes depressus (adults)
 3 Limnius volckmari (larva) 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Bessbrooke
SEASON	Summer	SITE	Millvale Bridge
SORTER	CK/PRH	SAMPLE CODE	NRA11 0183

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Sphaeriidae 2 Asellidae 3 Elmidae 4 Tipulidae

NET LOSSES NET GAINS

NOTES

1 Pisidium sp.
 2 Asellus aquaticus 1 only
 3 Elmis aenea (adult + larva)
 4 Dicranota sp. 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Curly
SEASON	Summer	SITE	Artikelly Bridge
SORTER	CC/PRH	SAMPLE CODE	NRA11 0026

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

		LOSSES	GAINS
A	<u>VIAL</u>	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 Oligochaeta 2 Asellidae

B	<u>SAMPLE</u>	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 supplied with sample)	3 Lymnaeidae 4 Hydroptilidae 5 Tipulidae

NET LOSSES NET GAINS

NOTES

2 Asellus aquaticus
 3 Lymnaea peregra 1 only
 4 Agraylea sp.
 5 Dicranota sp.

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Upper Bann
SEASON	Summer		SITE	Huntly
SORTER	CC/PRH		SAMPLE CODE	NRA11 0049

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

		LOSSES	GAINS
A	<u>VIAL</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE	BMWP FAMILIES NOT FOUND BY IFE None	ADDITIONAL FAMILIES FOUND BY IFE 1 Oligochaeta
B	<u>SAMPLE</u> Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE	BMWP FAMILIES NOT FOUND BY IFE (This box only completed when no vial supplied with sample)	ADDITIONAL FAMILIES FOUND BY IFE 2 Haliplidae 3 Elmidae 4 Simuliidae

NET LOSSES NET GAINS

NOTES	2 Haliplus sp. (larva) 1 only 3 Limnius volckmari (larva) 4 Simulium (Wilhelmia) sp. 1 only
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1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Blackwater (ARDS)
SEASON	Summer	SITE	Ballymartin Road Bridge
SORTER	CC/PRH	SAMPLE CODE	NRA11 0113

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Planorbidae 2 Erpobdellidae 3 Gammaridae 4 Coenagriidae

NET LOSSES NET GAINS

NOTES

1 Armiger crista, Bathynomphalus contortus
 3 Gammarus duebeni 1 only
 4 Indet Coenagriid 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland	RIVER	Six Mile Water
SEASON	Autumn	SITE	Castle Farm Br Antrim
SORTER	PRH	SAMPLE CODE	NRA11 0039

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Sphaeriidae

NET LOSSES NET GAINS

NOTES

1 Pisidium sp. 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland	RIVER	Kesh
SEASON	Autumn	SITE	Glendurragh
SORTER	PRH	SAMPLE CODE	NRA11 0140

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

		LOSSES	GAINS
A	<p style="text-align: center;"><u>VIAL</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in VIAL by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p>1 Leptoceridae*</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p>2 Beraeidae</p>
B	<p style="text-align: center;"><u>SAMPLE</u></p> <p>Differences between: i) BMWP families listed on sample data sheet and ii) BMWP families found in SAMPLE by IFE</p>	<p>BMWP FAMILIES NOT FOUND BY IFE</p> <p>(This box only completed when no vial supplied with sample)</p>	<p>ADDITIONAL FAMILIES FOUND BY IFE</p> <p>3 Limnephilidae 4 Leptoceridae* 5 Tipulidae</p>

NET LOSSES NET GAINS

NOTES

2 Beraeodes minutus
 3 Indet Limnephilid (pupa) 1 only
 4 Athripsodes sp. 1 only
 5 Dicranota sp., Tipula sp.

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland		RIVER	Upper Bann
SEASON	Autumn		SITE	Hilltown
SORTER	ION		SAMPLE CODE	NRA11 0051

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	None

NET LOSSES NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Woodford
SEASON	Autumn		SITE	Woodford
SORTER	ION		SAMPLE CODE	NRA11 0160

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	None

NET LOSSES NET GAINS

NOTES

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Lagan
SEASON	Autumn		SITE	Lisburn
SORTER	CK		SAMPLE CODE	NRA11 0097

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Valvatidae 2 Physidae

NET LOSSES NET GAINS

NOTES

1 Valvata piscinalis
2 Physa fontinalis

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N. Ireland	RIVER	Ravernet
SEASON	Autumn	SITE	Sprucefield
SORTER	CK	SAMPLE CODE	NRA11 0101

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Dendrocoelidae 2 Ancyliidae 3 Limnephilidae 4 Sericostomatidae

NET LOSSES 0 NET GAINS 4

NOTES

1 Dendrocoelum lacteum 1 only
 2 Ancyclus fluviatilis 1 only
 3 Micropterna sequax 1 only
 4 Sericostoma personatum 1 only

1990 RIVER QUALITY SURVEY

AQC - BIOLOGICAL SAMPLES

REGION	N.Ireland		RIVER	Lagan
SEASON	Autumn		SITE	Youngs Bridge
SORTER	CK		SAMPLE CODE	NRA11 0106

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

		LOSSES	GAINS
A	<u>VIAL</u>	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	<u>SAMPLE</u>	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 supplied with sample)	1 Dendrocoelidae 2 Valvatidae

NET LOSSES

NET GAINS

NOTES

1 Dendrocoelum lacteum
2 Valvata piscinalis, V cristata

