**EAST SPRING CREEK
FLATHEAD COUNTY, MONTANA**

SUPPLEMENTAL SAMPLING FOR BIOASSESSMENT
September 9, 1998

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Report prepared for
The Montana Department of Environmental Quality
Helena, Montana

by
Wease Bollman
Rhithron Biological Associates
Missoula, Montana

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INTRODUCTION

In an attempt to reduce non-point source water pollution in the East Spring and Trumbull Creek watersheds of Flathead County, Montana, land management practices have been altered as part of a demonstration project, one of several in Montana. The success of these projects is partly gauged by changes in the benthic macroinvertebrate communities of the area's streams, since the analysis of these communities can be related to a stream's biological health or integrity. Biological integrity has been defined by Karr and Dudley (1981) as "...the capability of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of natural habitat of the region." The framework for macroinvertebrate community analysis employed in these projects is an adaptation of the U.S. EPA's Rapid Bioassessment Protocols (RBP) (Plafkin et al. 1989).

The Rapid Bioassessment Protocols are additive multimetric approaches designed as "... an array of measures or metrics that individually provide information on diverse biological attributes, and when integrated, provide an overall indication of biological condition." (Barbour et al. 1995). Community attributes that can contribute meaningfully to interpretation of benthic data include assemblage structure, sensitivity of community members to stress or pollution, and functional traits. Each metric component contributes an independent measure of the biotic integrity of a stream site; combining the components into a total score reduces variance and increases precision of the assessment. (Fore et al. 1995).

Benthic macroinvertebrate assemblages from three sites on East Spring Creek and a single site on nearby Trumbull Creek were studied by the Montana Department of Environmental Quality (MT DEQ) using RBP methods in five previous years. Each year's data is presented in individual reports (Bukantis 1990, Brooks 1993, McGuire 1995, Bollman 1997) and a summary of all previous studies may be found in Bollman (1997). This report analyzes the data gathered in a supplemental, interim sampling of two sites on East Spring Creek in September 9, 1998. Both of these sites were included in sampling in the five previous years; this report compares and contrasts data from only these two sites. Analysis of data from the other two sites in the East Spring Creek / Trumbull Creek watersheds (East Spring Creek at Granite View and Trumbull Creek) may be found in Bollman (1997).

METHODS

Benthic macroinvertebrate sampling was performed by personnel of the Montana Department of Environmental Quality (MT DEQ) on September 9, 1998. Samples were collected from two reaches in East Spring Creek, below Farrier's dam and at the Highway 35 bridge. For quality assurance purposes, sampling at the site below Farrier's dam was replicated to provide an estimate of the variability inherent in the sampling and assessment methods.

Sample processing and data analyses were contracted to Rhithron Biological Associates. In the laboratory, the Rapid Bioassessment Protocol III (RBPIII) (Plafkin et al. 1989) was used to obtain subsamples of 300 (+/- 30) organisms from each sample. Community structure, function and sensitivity to impact were characterized for each subsample using two methods. First, data were evaluated using the Montana Valleys and Foothill Prairies (MVFP) ecoregion reference. In this approach, benthic communities

were compared with reference criteria established by MT DEQ for streams of the entire MVFP ecoregion (Bukantis 1998). The MVFP ecoregion reference uses an integration of eight metrics to characterize biotic health. The second method uses a revised bioassessment metric battery devised and tested for sensitivity to impairment, relevance to habitat and water quality impacts and replicability by Bollman (1998). The revised method employs six metrics. Data gathered at the two East Spring Creek sites in all previous years were re-evaluated using the revised method and comparisons and trends were examined. Total integrated metric scores were obtained for each method by summing scores for all metrics, and a "use support" designation was derived from the total bioassessment score based upon criteria described in Table 3.

RESULTS AND DISCUSSION

Habitat assessment

No new habitat assessment data was collected in 1998, but habitat evaluations in 1996 suggest that lack of a vegetated riparian zone compromised potential health at the Highway 35 site. Below Farrier's dam, poor riffle development, possibly related to geomorphologic alterations resulting from the upstream dam, was reported. Riparian zone width had apparently increased over the years. Total habitat assessment scores indicated optimal habitat below Farrier's dam and sub-optimal habitat at the Highway 35 site in 1996.

Bioassessment

Macroinvertebrate taxon lists, metric results and other information for each sample are given in the Appendix.

The Montana Valleys and Foothill Prairies Ecoregion reference

Figure 1 compares total bioassessment scores for East Spring Creek below Farrier's dam over the seven years of sampling based on integrated and summed metrics using the ecoregional reference scoring criteria. Figure 2 gives the same comparison for

Figure 1. Total bioassessment scores for East Spring Creek below Farrier's dam in seven years of sampling. Scores are based on the Montana Valleys and Foothill Prairies ecoregion reference (Bukantis 1998).

Figure 2. Total bioassessment scores for East Spring Creek at Highway 35 in seven years of sampling. Scores are based on the Montana Valleys and Foothill Prairies ecoregion reference (Bukantis 1998).

data gathered at the Highway 35 bridge. Table 1 summarizes the MVFP ecoregion reference method and criteria. Breakdown of values and scores for each metric in each of the seven years is presented in Tables 4 and 5.

Data collected in 1989 and 1990 at both sites are not strictly comparable to data collected in later years, since sample sizes were much smaller in the earlier years, and the required taxonomic resolution for such groups as midges (Diptera: Chironomidae) and worms (Oligochaeta) was different in those years. Consequently, total bioassessment scores for 1989 and 1990 are based on only six metrics; taxa richness and EPT richness measures were deleted from the analysis. Use-support categories were not applied to these scores, since they are unlikely to be adequate measures of biotic health. Data based on replicate samples collected from the Highway 35 site in 1992 were combined to achieve a single sample size comparable to the others.

Between 1991 and 1998, the site below Farrier's dam did not support designated uses in two of five years of study. In the most recent year, 1998, partial use support was indicated by bioassessment scores using the ecoregion reference. Scores in this year were the highest assigned to this site since the inception of sampling here. In those same years, the site at the Highway 35 bridge did not support designated uses in one of five years. Declines in bioassessment scores recorded in 1996 were partly mitigated in 1998. Partial use support was indicated at this site in every year since 1992.

A revised bioassessment method

Figure 3 compares bioassessment scores for the Farrier's dam site in all years studied, using a revised bioassessment method described in Bollman (1998). Figure 4 displays scores for the Highway 35 site. It is at once apparent that the revised method is much more rigorous; bioassessment scores resulting from its use are generally much

lower than those generated by the ecoregion reference method. In these illustrations, data from 1989 and 1990 are displayed as if sample sizes were equal. Richness measures based on those data are thus not comparable with the same measures calculated from the data of later years, when sample sizes were larger. Four of the six metrics comprising the revised bioassessment method are richness metrics. Bioassessment scores from data gathered in 1989 and 1990 are consequently not to be considered adequate measures of biotic health, and use-support designations have not been applied to these sites in those years.

Figure 3. Total bioassessment scores for East Spring Creek below Farrier's dam in seven years of sampling. Scores are based on a revised bioassessment method (Bollman 1998).

Figure 4. Total bioassessment scores for East Spring Creek at Highway 35 in seven years of sampling. Scores are based on a revised bioassessment method (Bollman 1998).

Use support designations assigned when data were evaluated using the revised bioassessment method indicate that, at the Farrier's dam site, East Spring Creek had not supported uses in any year studied. However, there has been some improvement in bioassessment scores in this reach; the mean score in 1998 was 83% higher than in 1996. At the Highway 35 bridge, partial use support was achieved in 1994 and again in 1998.

Table 6 summarizes the MVFP ecoregion reference method and criteria.

Breakdown of values and scores for each metric in each of the seven years is presented in Tables 7 and 8.

Macroinvertebrate communities

Over the years, the taxonomic composition of the benthic assemblage of East Spring Creek below Farrier's dam has remained quite constant. The tolerant caddisfly *Cheumatopsyche* sp. has frequently been the dominant taxon collected in samples, and the blackfly *Simulium* sp. has always been abundant. Both are filter-feeders, and in fact, filter feeding organisms have comprised an average of 55% of taxa collected at the site below Farrier's dam over the years studied. An abundance of filter-feeding organisms in samples used for bioassessment will typically result in low bioassessment scores using the methods employed here, since many of these taxa are considered quite tolerant to pollutants and warmer water temperatures. Their dominance suggests large amounts of suspended organic particulates. The ecoregional reference (Bukantis 1998) uses the metric "Collector-gatherers plus collector-filterers" as a negative indicator of habitat and/or water quality conditions, and the revised bioassessment method (Bollman 1998) uses the "Percent filterers" metric in much the same way. However, stream sites below dams are typically dominated by filter-feeding organisms (Ward 1984), possibly because of outflow of organic particles from lentic habitats above the dams. This effect may be present at the site below Farrier's dam and may persist even as far downstream as the Highway 35 site, where filter-feeders have comprised an average of 29% of sampled assemblages in the years studied.

Warm water temperatures relative to those expected in Montana Valleys and Foothill Prairies streams may limit the extent to which either of these bioassessment methods accurately reflects the biotic health of East Spring Creek. As McGuire pointed out in his summary of the 1994 data, the spring-influenced thermal regime in these reaches may be natural. Nonetheless, improvement in the complexity of benthic assemblages, evidenced by moderate increases in taxa richness and the addition of mayfly taxa at one or both sites over the years suggests that biotic health may have substantially improved since 1989 despite low bioassessment scores.

At Highway 35, five mayfly taxa were collected in 1998, the most in any sample from any year. Newly collected at the site were *Centropilum* sp. and *Tricorythodes minutus*, both quite tolerant but suggestive of increasing assemblage complexity. Generally, the benthic community at the site continued to indicate warmer water temperatures and inputs of organic matter. These impacts may be attributable to the thermal regime of the spring and/or to dam outflows. Some improvement in biotic health is suggested by increasing taxa richness and EPT richness over the years of study, and by the decrease in biotic index score in 1998. Since 1989, the average value for the biotic index at the Highway 35 site was 4.72, while in 1998 the calculated value, albeit from a single sample, was 3.65.

CONCLUSIONS

- Bioassessment methods developed for the Montana Valleys and Foothill Prairies ecoregion may not adequately evaluate biotic health in a system such as East Spring Creek, which is a spring-dominated stream. Low bioassessment scores when these methods are used may at least partly be a result of the limitations of the methods.
- The benthic assemblage below Farrier's dam was dominated by the isopod *Caecidotea* sp. which is a typical inhabitant of macrophytes in spring-fed streams, and by the filter feeders *Cheumatopsyche* sp., a net-spinning caddisfly and *Simulium* sp., a blackfly. Filter feeding organisms are typically dominant in streams below dam outflows. Low year-to-year variance in taxonomic composition of the assemblage below Farrier's dam is also characteristic of spring-fed streams where disturbance may be low and flow regimes constant.
- Mild increases in the taxa richness and EPT richness metrics suggest that biotic health has improved at the Highway 35 site over the years of study. The value for the biotic index may have also decreased in 1998, though the calculation was made on only a single sample. Benthic assemblages at the site continue to be determined by warmer water temperatures and abundant suspended organic material. The causes of these influences may be due to the spring-dominated thermal regime and/or the dam outflows, or there may be other, non-point sources. Poor canopy cover and lack of a wide riparian vegetative zone may contribute to impairment of biotic health as well.

TABLES

Table 1. Montana Valleys and Foothill Prairies ecoregion: Reference values for macroinvertebrate metrics, and scoring criteria. (Bukantis 1998)				
metric	Scoring criteria			
	3	2	1	0
Taxa richness	>28	28-21	21-14	<14
EPT richness	>14	14-13	12-11	<11
Biotic index	<4	4-5	5-6	>6
%dominant taxon	<30	30-40	40-50	>50
% collector: gatherers + filterers	<60	60-75	75-90	>90
%scrapers + shredders	>30	30-20	20-10	<10
%EPT	>60	60-45	45-30	<30

Table 2. Criteria for the assignment of support classifications / standards violation thresholds (Bukantis, 1998)	
% Comparability to reference	Use support
>75	Full support--standards not violated
25-75	Partial support--moderate impairment--standards violated
<25	Non-support--severe impairment--standards violated

Table 4. Metric values, percent of ecoregional reference, and bioassessments for East Spring Creek below Farrier's Dam. 1989-1998. Numbers in parenthesis represent calculations made without use of the full metric battery.

Metric	1989	1990	1991	1992	1994		1996	1998	
					a	b		a	b
Taxa richness	(11)	(11)	14	22	22	20	24	23	22
EPT richness	(2)	(4)	4	6	5	5	2	5	5
Biotic index	6.67	5.17	5.69	5.06	6.09	5.67	6.43	3.14	5.54
% Dominant taxon	32	64	59	59	36	40	43	34	31
% Collectors	87	94	99	92	95	95	93	92	84
% Scrapers plus shredders	13	1	1	3	3	3	2	3	8
% EPT	20	69	64	70	42	51	11	47	42
%H/T	100	99	100	97	100	100	100	100	100
Metric score									
Taxa richness	-	-	1	2	2	1	2	2	2
EPT richness	-	-	0	0	0	0	0	0	0
Biotic index	0	1	1	1	0	1	0	3	2
% Dominant taxon	2	0	0	0	2	2	1	2	2
% Collectors	1	0	0	0	0	0	0	0	1
% Scrapers plus shredders	1	0	0	0	0	0	0	0	0
% EPT	0	3	3	3	1	2	0	2	1
%H/T	0	0	0	0	0	0	0	0	0
Total score (maximum = 24)	(4)	(4)	5	6	5	6	3	9	8
Percent of maximum	(22)	(22)	21	29	21	29	14	37.5	33
Use support*	N.A.	N.A.	NON	PART	NON	PART	NON	PART	PART

* See Table 2 for use support designations

Table 5. Metric values, percent of ecoregional reference, and bioassessments for East Spring Creek at Highway 35. 1989-1998.
Numbers in parenthesis represent calculations made without use of the full metric battery.

Metric	1989	1990	1991		1992	1994		1996		1998
			a	b		a	b	a	b	
Taxa richness	(12)	(15)	14	16	19	28	28	24	22	26
EPT richness	(3)	(5)	4	2	3	8	8	5	3	8
Biotic index	5.61	4.04	5.17	5.17	4.00	4.35	4.73	5.20	5.15	3.65
% Dominant taxon	51	45	50	62	30	28	23	29	23	31
% Collectors	94	78	93	95	71	79	88	89	91	89
% Scrapers plus shredders	6	21	4	3	22	19	9	4	1	8
% EPT	19	63	6	2	8	9	16	17	23	15
%H/T	0	2	50	0	0	6	0	7	0	17
Metric score										
Taxa richness	-	-	1	1	1	2	2	2	2	2
EPT richness	-	-	0	0	0	0	0	0	0	0
Biotic index	1	2	1	1	2	2	2	1	1	3
% Dominant taxon	0	1	1	0	2	3	3	3	3	2
% Collectors	0	1	0	0	2	1	1	1	0	1
% Scrapers plus shredders	0	1	0	0	2	1	0	0	0	0
% EPT	0	3	0	0	0	0	0	0	0	0
%H/T	3	3	3	3	3	3	3	3	3	3
Total score (maximum = 24)	(4)	(11)	6	5	12	12	11	10	9	11
Percent of maximum	(22)	(61)	25	21	50	50	46	42	37.5	46
Use support*	N.A.	N.A.	PART	NON	PART	PART	PART	PART	PART	PART

* See Table 2 for use support designations

Table 6. Revised bioassessment method. Reference values for macroinvertebrate metrics, and scoring criteria. (Bollman 1998).

metric	Scoring criteria			
	3	2	1	0
Sensitive taxa richness	>3	2-3	1-2	0
Ephemeroptera taxa richness	>5	5-4	2-3	<2
Plecoptera taxa richness	>3	2-3	1	0
Trichoptera taxa richness	>4	3-4	2	<2
% filterers	0-5	5.01-10	10.01-25	>25
% tolerant organisms	0-5	5.01-10	10.01-35	>35

Table 7. Metric values, percent of ecoregional reference, and bioassessments for East Spring Creek below Farrier's Dam using the revised bioassessment method (Bollman 1998). 1989-1998.

Metric	1989	1990	1991	1992	1994		1996	1998	
					a	b		a	b
Ephemeroptera taxa richness	1	2	1	2	3	3	1	3	3
Plecoptera taxa richness	0	0	0	0	0	0	0	0	0
Trichoptera taxa richness	1	2	2	3	1	1	1	2	2
Sensitive taxa richness	0	0	0	0	0	0	0	0	0
Percent tolerant taxa	33	78	67	70	56	48	13	48	42
Percent filter-feeders	47	67	73	69	46	58	31	53	53
Metric score									
Ephemeroptera taxa richness	0	1	0	1	1	1	0	1	1
Plecoptera taxa richness	0	0	0	0	0	0	0	0	0
Trichoptera taxa richness	0	1	1	2	0	0	0	1	1
Sensitive taxa richness	0	0	0	0	0	0	0	0	0
Percent tolerant taxa	1	0	0	0	0	0	1	0	0
Percent filter-feeders	0	0	0	0	0	0	0	0	0
Total score (maximum = 18)	1	2	1	3	1	1	1	2	2
Percent of maximum	6	11	6	17	6	6	6	11	11
Use support*	N.A.	N.A.	NON	NON	NON	NON	NON	NON	NON

* See Table 2 for use support designations

Table 8. Metric values, percent of reference, and bioassessments for East Spring Creek at Highway 35 using the revised bioassessment method (Bollman 1998). 1989-1998.

Metric	1989	1990	1991		1992	1994		1996		1998
			a	b		a	b	a	b	
Ephemeroptera taxa richness	2	1	1	1	2	2	2	2	2	5
Plecoptera taxa richness	0	0	0	0	0	0	0	0	0	0
Trichoptera taxa richness	1	4	2	1	1	6	6	3	1	3
Sensitive taxa richness	0	0	0	0	0	1	1	0	0	0
Percent tolerant taxa	15	75	21	7	46	25	28	28	12.5	13
Percent filter-feeders	51	4	50	62	6	4	23	30	25	7
Metric score										
Ephemeroptera taxa richness	1	0	0	0	1	1	1	1	1	2
Plecoptera taxa richness	0	0	0	0	0	0	0	0	0	0
Trichoptera taxa richness	0	2	1	0	0	3	3	2	0	2
Sensitive taxa richness	0	0	0	0	0	1	1	0	0	0
Percent tolerant taxa	1	0	1	2	0	1	1	1	1	1
Percent filter-feeders	0	3	0	2	2	3	1	0	1	2
Total score (maximum = 18)	2	5	0	4	2	9	7	4	3	7
Percent of maximum	11	28	11	22	17	50	39	22	17	39
Use support*	N.A.	N.A.	NON	NON	NON	PART	PART	NON	NON	PART

* See Table 2 for use support designations

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APPENDIX

Macroinvertebrate Taxonomic Data:

East Spring Creek below Farrier's dam, 20 ft. above guaging station. September 9, 1998.

Taxon	#	%RA	hbi	FFG
Oligochaeta:	4	1.30	10	CG
Ferrissia	3	0.97	6	SC
Gammarus	23	7.47	4	CG
Caecidotea	35	11.36	8	CG
TOTAL: MISC. TAXA	65	21.10		
Coenagrionidae: Enallagma	1	0.32	7	PR
TOTAL: ODONATA	1	0.32		
Baetis tricaudatus	28	9.09	4	CG
Diphetero hageni	5	1.62	5	CG
Paraleptophlebia	2	0.65	1	CG
TOTAL: EPHEMEROPTERA	35	11.36		
Cheumatopsyche	106	34.42	5	CF
Hydropsyche	3	0.97	5	CF
TOTAL: TRICHOPTERA	109	35.39		
Petrophila	1	0.32	5	SC
TOTAL: LEPIDOPTERA	1	0.32		
Optioservus	4	1.30	5	SC
Zaitzevia	7	2.27	4	CG
TOTAL: COLEOPTERA	11	3.57		
Hemerodromia	9	2.92	5	PR
Simulium	55	17.86	6	CF
TOTAL: DIPTERA	64	20.78		
Cricotopus	1	0.32	7	CG
Microspectra	3	0.97	4	CG
Microtendipes	4	1.30	6	CG
Orthocladius	1	0.32	6	CG
Pagastia	4	1.30	1	CG
Parametriocnemus	1	0.32	5	CG
Thienemanniella	1	0.32	6	CG
Thienemannimyia	7	2.27	5	PR
TOTAL: CHIRONOMIDAE	22	7.14		
GRAND TOTAL	308	100.00

Macroinvertebrate Taxonomic Data:

East Spring Creek below Farrier's dam, above gauging station. September 9, 1998.

Taxon	#	%RA	hbi	FFG
Oligochaeta: Tubificidae	4	1.19	10	CG
Ferrissia	3	0.89	6	SC
Gammarus	5	1.49	4	CG
Hyallela azteca	17	5.06	8	CG
Caecidotea	41	12.80	8	CG
Acari	2	0.60	5	PA
TOTAL: MISC. TAXA	72	22.02		
Baetis tricaudatus	15	4.46	4	CG
Diphetor hageni	3	0.89	5	CG
Paraleptophlebia	3	0.89	1	CG
TOTAL: EPHEMEROPTERA	21	6.25		
Cheumatopsyche	102	30.95	5	CF
Hydropsyche	17	5.06	5	CF
TOTAL: TRICHOPTERA	119	36.01		
Petrophila	19	5.65	5	SC
TOTAL: LEPIDOPTERA	19	5.65		
Optioservus	5	1.49	5	SC
Zaitzevia	4	1.19	4	CG
TOTAL: COLEOPTERA	9	2.68		
Hemerodromia	14	4.17	6	PR
Simulium	51	15.77	5	CF
TOTAL: DIPTERA	65	19.94		
Micropsectra	5	1.49	4	CG
Microtendipes	2	0.60	6	CG
Pagastia	1	0.30	1	CG
Rheotanytarsus	4	1.19	6	CF
Thienemanniella	3	0.89	6	CG
Thienemannimyia	10	2.98	5	PR
TOTAL: CHIRONOMIDAE	25	7.44		
GRAND TOTAL	330	100.00

Aquatic Macroinvertebrate Data: East Spring Creek at Highway 35

September 9, 1998

% of sample used:	27
Subsample size	330
Taxa richness	27
EPT richness	8
Biotic index	3.65
% Dominant taxon	31
% EPT	15
% Collectors (g+f)	89
% Scrapers + Shredders	8
% Hydropsychinae of Trich	17
Metals tolerance index	4.54
Shannon Diversity (log2)	3.18
EPT/Chironomidae	24
CTQa	94.67
%Baetidae of Ephemeroptera	93
% Coleoptera	6
% Diptera	7
% Chironomidae	63
% Ephemeroptera	13
% Plecoptera	0
% Trichoptera	2
% multivoltine	60
% univoltine	33
% semivoltine	7

Functional Feeding Grp.	%RA	# taxa
Filterers	7	2
Collector-Gatherers	82	17
Shredders	<1	1
Scrapers	7	4
Predators	1	2

Est. total number of organisms	1222
Est. number collected per foot	220
Est. number collected per minute	1222

**Aquatic Macroinvertebrate Data: East Spring Creek below Farrier's dam
September 9, 1998.**

Sample:	1	2
% of sample used:	37	70
Subsample size	308	330
Taxa richness	23	22
EPT richness	5	5
Biotic index	5.20	5.54
% Dominant taxon	34	31
% EPT	47	42
% Collectors (g+f)	92	84
% Scrapers + Shredders	3	8
% Hydropsychinae of Trich	100	100
Metals tolerance index	4.46	4.38
Shannon Diversity (log2)	3.14	3.39
EPT/Chironomidae	6.55	5.68
CTQa	98.74	98.32
%Baetidae of Ephemeroptera	94	86
% Coleoptera	4	3
% Diptera	21	20
% Chironomidae	7	7
% Ephemeroptera	11	6
% Plecoptera	0	0
% Trichoptera	35	36
% multivoltine	22	19
% univoltine	74	78
% semivoltine	4	3

Functional Feeding Grp.	%RA	# taxa	%RA	# taxa
Filterers	53	3	53	4
Collector-Gatherers	39	14	31	12
Shredders	0	0	0	0
Scrapers	3	3	8	3
Predators	6	3	7	2

Est. total number of organisms	832	471
Est. number collected per foot	92	79
Est. number collected per minute	1664	942

Macroinvertebrate Taxonomic Data:

East Spring Creek above Hwy 35. September 9, 1998

Taxon	#	%RA	hbi	FFG
Turbellaria	3	0.91	4	PR
Oligochaeta: Lumbriculidae	6	1.82	10	CG
Lymnaeidae	9	2.73	6	SC
Physella	2	0.61	8	SC
Caecidotea	4	1.21	8	CG
Acari	6	1.82	5	PA
TOTAL: MISC. TAXA	30	9.09		
Baetis tricaudatus	33	10.00	4	CG
Centropilum	1	0.30	2	CG
Dipheter hageni	7	2.12	5	CG
Ephemerella	2	0.61	1.5	CG
Tricorythodes minutus	1	0.30	4	CG
TOTAL: EPHEMEROPTERA	44	13.33		
Cheumatopsyche	1	0.30	5	CF
Hydroptila	4	1.21	6	CG
Rhyacophila Ljeftincki Group	1	0.30	1	PR
TOTAL: TRICHOPTERA	6	1.82		
Dubiraphia	1	0.30	6	SC
Optioservus	12	3.64	5	SC
Zaitzevia	6	1.82	4	CG
Brychius	1	0.30	5	SH
TOTAL: COLEOPTERA	20	6.06		
Simulium	22	6.67	5	CF
TOTAL: DIPTERA	22	6.67		
Eukiefferiella Gracei Gr.	1	0.30	4	CG
Eukiefferiella Pseudomontana Gr.	2	0.61	8	CG
Micropsectra	102	30.91	4	CG
Orthocladus	3	0.91	6	CG
Pagastia	88	26.67	1	CG
Rheocricotopus	7	2.12	4	CG
Thienemanniella	1	0.30	6	CG
Tvetenia Bavarica Gr.	4	1.21	5	CG
TOTAL: CHIRONOMIDAE	208	63.03		
GRAND TOTAL	330	100.00