

JUNE 2009

BIOLOGICAL ASSESSMENT
OF SITES IN THE
GALLATIN RIVER DRAINAGE,
GALLATIN COUNTY,
MONTANA:
MACROINVERTEBRATE ASSEMBLAGES

A REPORT TO
THE BLUE WATER TASK FORCE



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INTRODUCTION

With increased development in the watershed, the integrity of the Gallatin River and its tributaries may be threatened by impacts to channel structure and riparian zones as well as by degradation of water quality. Monitoring and assessment of biological assemblages can help to detect changes, possibly suggesting that impacts and degradation are in fact occurring. For the past several years, the Blue Water Task Force (BWTF) has sampled benthic macroinvertebrates for monitoring and assessment of the waters of the Gallatin River drainage. Benthic macroinvertebrates are a useful tool for evaluating the effects of stressors that may be associated with the accelerating human influences on the River. Such stressors may include pollutants, sediment, thermal impacts and hydrologic alterations, and changes to the natural morphology of river channels and riparian zones.

In April 2009, replicated samples were collected at sites in the Gallatin River watershed. One of these sites (the West Fork of the Gallatin River upstream of the Big Sky spur road) had been previously sampled in April and September 2008. This report describes the methods for processing and identifying the macroinvertebrate samples collected in April 2009. Data resulting from that work were translated into a multimetric index, and scores were calculated. Scores generated from 2008 samples collected on the West Fork were graphically compared with 2009 scores. Narrative interpretations of the ecological condition of the macroinvertebrate assemblages are given. These narratives use the taxonomic and functional composition, tolerance and sensitivity characteristics, and habits of the benthic invertebrates to describe probable water quality and habitat influences on the assemblages. Interpretations maximize the information available in the data by not relying solely on a single cumulative index score which may mask the effects of stressors on the biota.

METHODS

Sample processing

Eight macroinvertebrate samples, which were paired replicate samples collected at 4 sites in the Gallatin River drainage, were delivered to Rhithron's laboratory facility in Missoula, Montana. All samples arrived in good condition. Habitat assessment forms were also provided by BWTF.

Subsamples of a minimum of 300 organisms were obtained using methods consistent with Montana Department of Environmental Quality (MDEQ) standard procedures (MDEQ 2006): Caton sub-sampling devices (Caton 1991), divided into 30 grids, each approximately 5 cm by 6 cm were used. Each individual sample was thoroughly mixed in its jar(s), poured out and evenly spread into the Caton tray, and individual grids were randomly selected. Grid contents were examined under stereoscopic microscopes using 10x – 30x magnification. All aquatic invertebrates from each selected grid were sorted from the substrate, and placed in 95% ethanol for subsequent identification. Grid selection, examination, and sorting continued until at least 300 organisms were sorted. The final grid was completely sorted of all organisms.

Organisms were individually examined using 10x – 80x dissecting scopes (Leica S8E and S6E) and identified to the lowest practical level consistent with MDEQ (MDEQ 2006) data requirements, using appropriate published taxonomic references and keys.

Identification, counts, life stages, and information about the condition of specimens were recorded on bench sheets. To obtain accuracy in richness measures, organisms that could not be identified to the target level specified in MDEQ protocols were designated as “not unique” if other specimens from the same group could be taken to target levels. Organisms designated as “unique” were those that could be definitively distinguished from other organisms in the sample. Identified organisms were preserved in 95% ethanol in labeled vials, and archived at the Rhithron laboratory. Midges were morphotyped using 10x – 80x dissecting microscopes (Leica S8E and S6E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were archived at the Rhithron laboratory along with the other identified invertebrates.

Quality control procedures

Quality control (QC) procedures for initial sample processing and subsampling involved checking sorting efficiency. These checks were conducted on 100% of the samples by independent observers who microscopically re-examined 20% of sorted substrate from each sample. All organisms that were missed were counted and this number was added to the total number obtained in the original sort. Sorting efficiency was evaluated by applying the following calculation:

$$SE = \frac{n_1}{n_{1+2}} \times 100$$

where: SE is the sorting efficiency, expressed as a percentage, n_1 is the total number of specimens in the first sort, and n_{1+2} is the total number of specimens in the first and second sorts combined.

Quality control procedures for taxonomic determinations of invertebrates involved checking accuracy, precision and enumeration. One sample was randomly selected and all organisms re-identified and counted by an independent taxonomist. Taxa lists and enumerations were compared by calculating a Bray-Curtis similarity statistic (Bray and Curtis 1957) for the selected sample.

Data analysis

Taxa and counts for each sample were entered into Rhithron’s database application (RIALIS v.2.1). Life stages, “unique” designations, and the condition of specimens were also entered. Bioassessment metrics were calculated by the database application and a multimetric index developed for montane ecoregions of Montana (Bollman 1998) was calculated and scored.

Narrative interpretations of the taxonomic and functional composition of the aquatic invertebrate assemblages are based on demonstrated associations between assemblage components and habitat and water quality variables gleaned from the published literature, the writer’s own research (especially Bollman 1998) and professional judgment, and those of other expert sources (especially Wisseman 1996). These interpretations are not intended to replace canonical procedures for stressor identification, since such procedures require substantial surveys of habitat, and historical and current data related to water quality, land use, point and non-point source influences, soils, hydrology, geology, and other resources that were not readily available for this study. Instead, attributes of invertebrate taxa that are well-substantiated in

diverse literature, published and unpublished research, and that are generally accepted by regional aquatic ecologists, are combined into descriptions of probable water quality and instream and reach-scale habitat conditions.

The approach to this analysis uses some assemblage attributes that are interpreted as evidence of water quality and other attributes that are interpreted as evidence of habitat integrity. Attributes are considered individually, so information is maximized by not relying on a single cumulative score, which may mask stress on the biota.

Water quality variables are estimated by examining mayfly taxa richness and the Hilsenhoff Biotic Index (HBI) value. Other indicators of water quality include the richness and abundance of hemoglobin-bearing taxa and the richness of sensitive taxa. Mayfly taxa richness has been demonstrated to be significantly correlated with chemical measures of dissolved oxygen, pH, and conductivity (e.g. Bollman 1998, Fore et al. 1996, Wisseman 1996). The Hilsenhoff Biotic Index (HBI) (Hilsenhoff 1987) has a long history of use and validation (Cairns and Pratt 1993). In Montana foothills, the HBI was demonstrated to be significantly associated with conductivity, pH, water temperature, sediment deposition, and the presence of filamentous algae (Bollman 1998). The presence of filamentous algae is also suspected when macroinvertebrates associated or dependent on it (e.g. LeSage and Harrison 1980, Anderson 1976) are abundant. Nutrient enrichment in Montana streams often results in large crops of filamentous algae (Watson 1988). Sensitive taxa exhibit intolerance to a wide range of stressors (e.g. Wisseman 1996, Hellawell 1986, Friedrich 1990, Barbour et al. 1999), including nutrient enrichment, acidification, thermal stress, sediment deposition, habitat disruption, and others. These taxa are expected to be present in predictable numbers in functioning montane and foothills streams (e.g. Bollman 1998).

Thermal characteristics of the sampled site are predicted by the richness and abundance of cold stenotherm taxa (Clark 1997), and by calculation of the temperature preference of the macroinvertebrate assemblage (Brandt 2001). Hemoglobin-bearing taxa are also indicators of warm water temperatures (Walshe 1947), since dissolved oxygen is directly associated with water temperature; oxygen concentrations can also vary with the degree of nutrient enrichment. Increased temperatures and high nutrient concentrations can, alone or in concert, create conditions favorable to hypoxic sediments, habitats preferred by hemoglobin-bearers.

The condition of instream and streamside habitats is estimated by characteristics of the macroinvertebrate assemblages. Stress from sediment is evaluated by caddisfly richness and by "clinger" richness (Kleindl 1996, Bollman 1998, Karr and Chu 1999). A newer tool, the Fine Sediment Biotic Index (FSBI) (Relyea et al. 2000) shows promise when applied to the montane and foothills regions.

The functional characteristics of macroinvertebrate assemblages are based on the morphology and behaviors associated with feeding, and are interpreted in terms of the River Continuum Concept (Vannote et al. 1980) in the narratives. Alterations from predicted patterns in montane and foothills streams may be interpreted as evidence of water quality or habitat disruption. For example, shredders and the microbes they depend on are sensitive to modifications of the riparian zone (Plafkin et al. 1989).

Narrative interpretations of April 2009 data are made on the basis of the combined results of replicated samples.

The results of habitat assessments are reported. These assessments were made by BWTF personnel using a method recommended by the Montana Department of

Environmental Quality (MDEQ 1998). Instream, streambank, and reach-scale parameters were evaluated. The relationship of bioassessment scores and habitat assessment scores is investigated graphically.

RESULTS

Quality Control Procedures

Results of quality control procedures for subsampling and taxonomy are given in Table 1. Sorting efficiency averaged 98.2% for all samples, taxonomic precision for identification and enumeration was 96.5% for the randomly selected sample, and data entry efficiency averaged 100% for the project.

Table 1. Results of quality control procedures for subsampling and taxonomy.

Site name	Site Identifier	Rep	Sorting efficiency	Bray-Curtis similarity for taxonomy and enumeration
North Fork of the West Fork of the Gallatin River	NORTH FORK	1	98.45	96.5%
		2	100	
South Fork of the West Fork of the Gallatin River	SOUTH FORK	1	96.81	
		2	97.01	
Middle Fork of the West Fork of the Gallatin River	MIDDLE FORK	1	96.93	
		2	100	
West Fork of the Gallatin River, upstream of Big Sky Spur Rd. bridge	WEST FORK	1	96.25	
		2	100	

Bioassessment

Table 2 summarizes values and scores for metrics in the bioassessment index (Bollman 1998) used to evaluate the aquatic invertebrate assemblages. Results for each replicate are reported. Total scores for replicates and averaged scores for each replicate pair are given, and impairment classifications based on averaged replicate scores are also calculated.

When this index is applied to the Gallatin watershed invertebrate data, averaged scores indicate slight impairment at the West Fork site. However, one of the replicates yielded scores indicating unimpaired conditions. All other sites obtained scores indicated unimpaired conditions. Figure 1 graphs total scores for 2009 replicates and compares scores for West Fork samples collected in 2009 with those collected in spring and fall, 2008.

Table 2. Bioassessment index (Bollman 1998) and individual metrics and scores for replicated samples taken at 4 sites in the Gallatin River drainage, April 2009.

	NORTH FORK		SOUTH FORK		MIDDLE FORK		WEST FORK	
METRICS	METRIC VALUES							
Ephemeroptera richness	5	5	8	7	5	6	6	5
Plecoptera richness	6	6	3	5	2	1	5	1
Trichoptera richness	2	5	8	6	6	5	6	3
Number of sensitive taxa	5	8	5	5	3	4	3	3
Percent filterers	0.00%	0.00%	5.76%	5.49%	0.33%	1.57%	0.98%	0.88%
Percent tolerant taxa	0.00%	0.00%	1.36%	1.52%	4.62%	0.94%	7.49%	2.35%
	METRIC SCORES							
Ephemeroptera richness	2	2	3	3	2	3	3	2
Plecoptera richness	3	3	2	3	2	1	3	1
Trichoptera richness	1	3	3	3	3	3	3	2
Number of sensitive taxa	3	3	3	3	2	3	2	2
Percent filterers	3	3	2	2	3	3	3	3
Percent tolerant taxa	3	3	3	3	3	3	2	3
TOTAL SCORE (max.=18)	15	17	16	17	15	16	16	13
PERCENT OF MAX.	83.33%	94.44%	88.89%	94.44%	83.33%	88.89%	88.89%	72.22%
Average of replicates	88.89%		91.67%		86.11%		80.56%	
Impairment classification*	NON		NON		NON		SLI	

* Impairment classifications: (NON) non-impaired, (SLI) slightly impaired, (MOD) moderately impaired, (SEV) severely impaired.

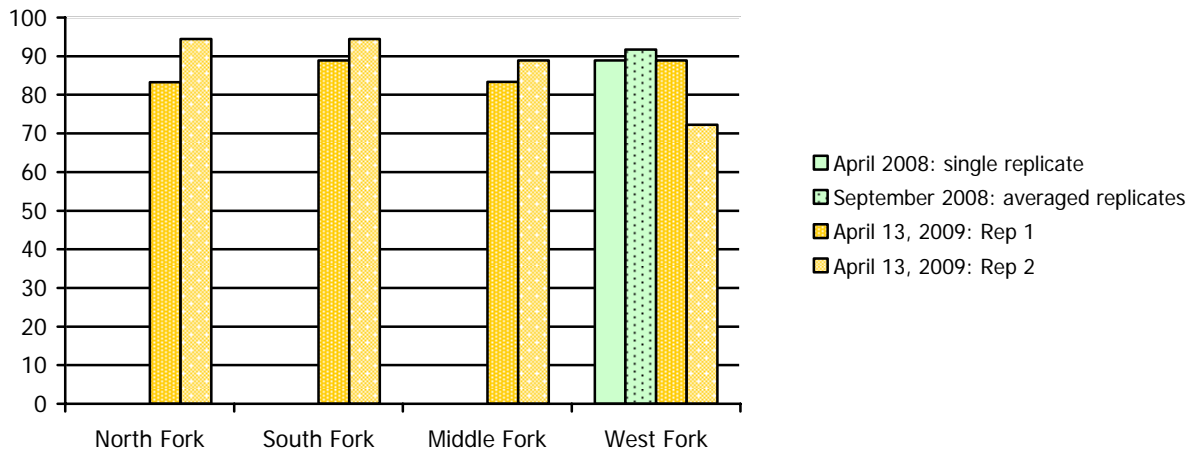


Figure 1. Bioassessment scores for four sites in the Gallatin River drainage. Scores are given for a single sample collected in April 2008 and averaged replicates collected from the West Fork in September 2008 (green bars) and for sample replicates collected in April 2009 (yellow bars).

Aquatic invertebrate assemblages: combined replicates

North Fork of the West Fork (NORTH FORK)

At least 6 mayfly taxa were supported at this site in April 2009, although none were abundant in the samples taken at that time. The biotic index value (3.61) was within expectations for a riverine environment. Ten sensitive taxa were collected, including the stonefly *Doroneuria* sp. and the mayfly *Drunella doddsii*; however, none of the sensitive taxa were represented by more than a few individuals. Although the high mayfly taxa richness and relatively low biotic index value suggest that water quality was good in the reach, other metric indicators of water quality gave contrary results. For example, the abundance of *Orthocladus* spp. among the midges suggests that filamentous algae may have been present. Large crops of filamentous algae may signal nutrient enrichment. Midges were exceptionally abundant, accounting for 42% of animals in the samples.

Several specimens of the flatworm *Polycelis coronata* were collected; these animals may be associated with groundwater seeps, and suggest that surface flows in the reach may be augmented by groundwater gains. At least 9 cold stenotherm taxa were present in the reach, and the calculated thermal preference of the invertebrate assemblage was 10.4°C. It seems likely that cold water temperatures and mild nutrient enrichment may have influenced the benthic fauna at this site.

Seven caddisfly taxa were counted, but the group only accounted for 3.5% of collected animals. There were also slightly fewer "clinger" taxa (13) than expected. These findings suggest that fine sediment deposition may have limited colonization of stony substrate habitats. On the other hand, the FSBI value (6.14) suggested that the assemblage was moderately intolerant of sediment deposition. The abundance of shredder taxa suggests that stony substrate surfaces may have been partly obliterated by large organic material such as leaves and woody debris. Overall taxa richness (36)

was somewhat lower than expected for an undisturbed montane river. Instream habitats may have been monotonous. High stonefly taxa richness (7) may be related to stable streambanks, intact riparian zones, and undisturbed channel morphology. Three semivoltine taxa were counted, indicating year-round surface flow and the absence of catastrophic scour or dewatering.

All expected functional components were represented in the samples, but the dominance of gatherers suggests mild water quality impairment. Shredders were abundant, which may indicate ample large organic material from riparian sources.

South Fork of the West Fork (SOUTH FORK)

Mayflies were both diverse and abundant at this site. Nine taxa, accounting for 27% of sampled animals, were present. The biotic index value (3.65) was within expected limits for a montane river. Seven sensitive taxa, including the caddisfly *Oligophlebodes* sp. and the mayfly *Caudatella edmundsi* were collected. These findings suggest that water quality was good in this reach. Four cold stenotherm taxa were counted, and the thermal preference for the assemblage was calculated at 12.9°C.

Both “clingers” (18 taxa) and caddisflies (9 taxa) were well-represented, making it seem likely that stony substrate habitats were not contaminated by sediment deposition. The FSBI value (4.81) indicated a moderately sediment intolerant benthic assemblage. Overall taxa richness (45) was high, implying diverse instream habitats. Five stonefly taxa were collected; high richness in this group may be related to intact reach-scale habitat features. Year-round surface flow is indicated by the presence of 5 semivoltine taxa.

The functional composition included all expected groups. Gatherers dominated the mix, which might indicate mildly impaired water quality, but there was no additional evidence of such impairment in the taxonomic composition of the benthic fauna. Shredders were abundant, suggesting that riparian inputs of large organic material such as leaves, blades, and woody debris were an important energy source.

Middle Fork of the West Fork (MIDDLE FORK)

Samples collected from the Middle Fork site were overwhelmed by midges; the genera *Micropsectra* spp., *Orthocladius* spp., and *Eukiefferiella gracei* were particularly abundant. This chironomid assemblage suggests the presence of filamentous algae. Abundant crops of filamentous algae could indicate nutrient enrichment. The large number of midge pupae in the sample influenced the biotic index value (5.82) which was much higher than expected for a montane stream, implying a tolerant invertebrate assemblage. A few hemoglobin-bearing taxa (*Polypedilum* sp. and *Stictochironomus* sp.) were present, suggesting areas of hypoxic substrates. On the other hand, mayfly taxa richness was high: 8 taxa were present in the samples, suggesting relatively good water quality. At least 5 sensitive taxa were supported at this site, including the mayfly *Drunella doddsii* and the caddisfly *Oligophlebodes* sp. Given these findings, it seems likely that water quality was only slightly degraded; mild nutrient enrichment may have stimulated the growth of filamentous algae, but effects of pollutants were not severe. Only 2 cold-stenotherm taxa were collected; the calculated thermal preference of the assemblage was 12.7°C.

Seven caddisfly taxa and 15 “clinger” taxa were counted in samples. The FSBI value (5.12) indicated a moderately sediment-intolerant assemblage. Stony substrate habitats appear to have been available for colonization; sediment deposition was probably not significant in the reach. Overall taxa richness (41) was within expectations, and suggested diverse instream habitats. Stonefly taxa richness, however, was lower than expected: only 3 stonefly taxa were present. Low stonefly richness may be related to impaired reach-scale habitat features: unstable streambanks, altered channel morphology, or riparian disturbances may be indicated. Semivoltine taxa were well-represented, indicating year-round surface flow and absence of recent catastrophes such as toxic pollutants or thermal stress.

Although all expected feeding groups were present, gatherers overwhelmed the functional composition of the assemblage. The dominance of gatherers is sometimes interpreted as suggestive of water quality degradation.

West Fork of the Gallatin River: upstream of Big Sky Spur Bridge (WEST FORK)

Six mayfly taxa were collected in samples collected at this site; 10 taxa were collected in 2008. The biotic index value (4.63) remained higher than expected in 2009, indicating a moderately tolerant assemblage. Similar to the previous year, midges dominated the benthic fauna, accounting for 77% of animals in the samples. The most abundant midges were *Micropsectra* spp., *Orthocladius* spp., and *Eukiefferiella gracei*. This trio is similar to the dominant taxa in 2008, and suggests the presence of filamentous algae. It seems likely that mild nutrient enrichment has persisted in this reach. Thermal conditions appear to have remained stable: the calculated preference of the 2009 assemblage was 13.3°C. Cold stenotherms were represented by only a few specimens in a single taxon.

Although the number of caddisfly taxa (6) remained constant between the years, “clinger” richness diminished from 18 taxa in 2008 to only 12 taxa in 2009. Fine sediment deposition may have had a negative effect on instream habitat integrity in the interim. The FSBI value (5.12), however, suggests a moderately sediment-intolerant assemblage. Overall taxa richness (36) was lower than expected in 2008; diminished diversity may be related to degradation of instream habitats. Stonefly taxa richness (5) was high. Stable streambanks, intact riparian zones, and unaltered channel morphology may be implied. Year-round surface flow is indicated by the presence of 4 semivoltine taxa. Gatherers dominated the functional mix; this pattern may be related to water quality degradation.

Habitat assessment

Table 3 gives the results of habitat assessment at each of the 4 sampled sites. All but one of the habitat measures were rated optimal or sub-optimal. The streambank on the left side of the South Fork site was perceived to be moderately unstable. Cumulative scores indicated optimal habitat conditions at all four sites visited in April 2009.

Relating bioassessment to habitat assessment

When habitat assessment scores are plotted against bioassessment scores, the resulting figure provides an opportunity to evaluate the hypothetical relationship

between habitat integrity and water quality. Both factors are critical and interactive determinants of the composition and functional integrity of aquatic invertebrate assemblages. Presumably, high quality habitat, in the absence of impairments to water quality, supports functional, diverse, and sensitive invertebrate assemblages; these are assemblages that attain high bioassessment scores. Barbour and Stribling (1991) have hypothesized that diminishing habitat quality should produce predictable diminishment of bioassessment scores, when water quality is not a further insult. Figure 2 is a plot of habitat assessment scores against bioassessment scores for the sampled assemblages. The red line superimposed on the plot roughly represents the hypothetical relationship between habitat quality and biotic integrity given good water quality. Symbols for each of the sites sampled for this study fall in the upper right area of the plot, suggesting good water quality and intact habitats at all locations.

Table 3. Stream and riparian habitat assessment. Sites were assessed based upon criteria developed by Montana DEQ for streams with riffle/run prevalence (MDEQ 1998). Gallatin River drainage, April 2009.

Max. possible score	Parameter	NORTH FORK	SOUTH FORK	MIDDLE FORK	WEST FORK
10	Riffle development	10	10	10	10
10	Benthic substrate	8	8	8	10
20	Embeddedness	20	17	20	20
20	Channel alteration	20	11	16	15
20	Sediment deposition	20	20	20	20
20	Channel flow status	20	20	18	20
20	Bank stability	10 / 10	5 / 10	10 / 10	9 / 10
20	Bank vegetation	10 / 10	6 / 8	10 / 10	10 / 10
20	Vegetated zone	8 / 10	10 / 6	10 / 8	8 / 10
160	Total	156	131	150	152
	Percent of maximum	97.5%	81.9%	93.8%	95.0%
	CONDITION*	OPTIMAL	OPTIMAL	OPTIMAL	OPTIMAL

* Condition categories: Optimal > 80% of maximum score; Sub-optimal 75 - 56%; Marginal 49 - 29%; Poor <23%. Plafkin et al. 1989.

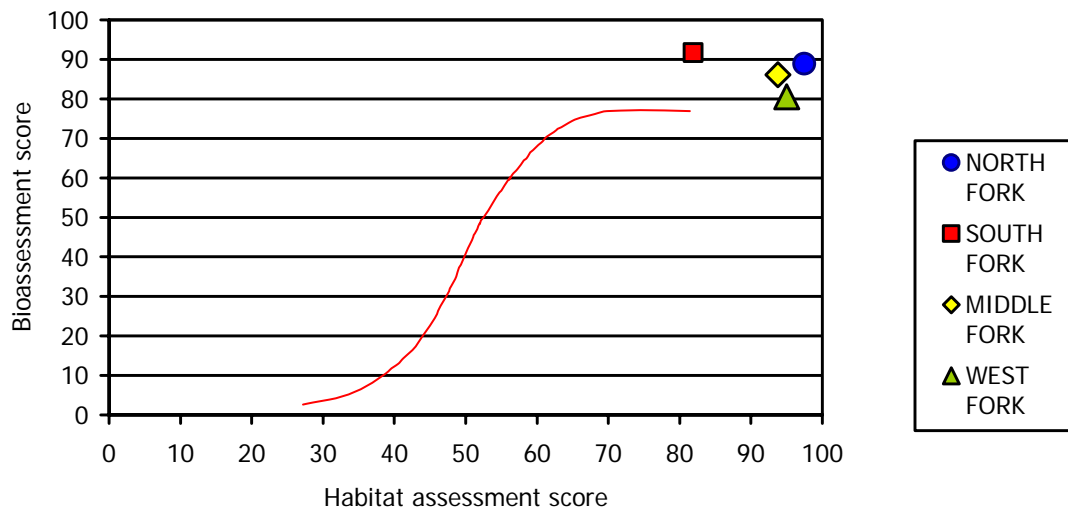


Figure 2. Average bioassessment scores plotted against habitat assessment scores (Barbour and Stribling 1991) for 4 sites in the Gallatin River drainage, April 2009.

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APPENDIX

Taxa lists and metric summaries

**Blue Water Task Force
Gallatin River Watershed**

April 2009

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR001

RAI No.: BWTF09GR001

Sta. Name: Gallatin River: North Fork of the West Fork REP
1

Client ID: NF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Enchytraeidae							
<i>Mesenchytraeus</i> sp.	8	2.55%	Yes	Unknown		4	CG
Planariidae							
<i>Polycelis coronata</i>	4	1.27%	Yes	Unknown		1	OM
Ephemeroptera							
Ephemerellidae							
<i>Drunella</i> sp.	27	8.60%	Yes	Larva	Early Instar	1	SC
<i>Drunella doddsii</i>	1	0.32%	Yes	Larva		1	SC
<i>Ephemerella inermis</i>	1	0.32%	Yes	Larva		4	SH
Ephemerellidae	1	0.32%	No	Larva	Damaged	1	CG
Heptageniidae							
<i>Cinygmula</i> sp.	1	0.32%	Yes	Larva		0	SC
<i>Rhithrogena</i> sp.	6	1.91%	Yes	Larva		0	CG
Plecoptera							
Chloroperlidae							
<i>Sweltsa</i> sp.	3	0.96%	Yes	Larva		0	PR
Nemouridae							
Nemouridae	12	3.82%	No	Larva	Early Instar	2	SH
<i>Podmosta</i> sp.	1	0.32%	Yes	Larva		2	SH
<i>Prostoia</i> sp.	40	12.74%	Yes	Larva		2	SH
<i>Zapada cinctipes</i>	1	0.32%	Yes	Larva		3	SH
Perlidae							
<i>Doroneuria</i> sp.	1	0.32%	Yes	Larva		0	PR
Taeniopterygidae							
Taeniopterygidae	2	0.64%	Yes	Larva		2	SH
Trichoptera							
Hydropsychidae							
<i>Parapsyche elsis</i>	1	0.32%	Yes	Larva		1	PR
Rhyacophilidae							
<i>Rhyacophila</i> sp.	3	0.96%	No	Larva	Early Instar	1	PR
<i>Rhyacophila Betteni</i> Gr.	6	1.91%	Yes	Larva		0	PR
Coleoptera							
Elmidae							
Elmidae	1	0.32%	No	Larva	Early Instar	4	CG
<i>Heterlimnius</i> sp.	6	1.91%	Yes	Larva		3	CG
Diptera							
Empididae							
<i>Neoplasta</i> sp.	1	0.32%	Yes	Larva		5	PR
<i>Wiedemannia</i> sp.	1	0.32%	Yes	Larva		6	PR
Pelecorhynchidae							
<i>Glutops</i> sp.	2	0.64%	Yes	Larva		1	PR
Psychodidae							
Psychodidae	10	3.18%	Yes	Larva		4	CG

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR001

RAI No.: BWTF09GR001

Sta. Name: Gallatin River: North Fork of the West Fork REP
1

Client ID: NF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Chironomidae							
Chironomidae							
<i>Eukiefferiella</i> sp.	2	0.64%	No	Pupa		8	CG
<i>Eukiefferiella</i> sp.	1	0.32%	No	Larva	Damaged	8	CG
<i>Eukiefferiella</i> Gracei Gr.	11	3.50%	Yes	Larva		8	CG
<i>Micropsectra</i> sp.	5	1.59%	Yes	Larva		4	CG
Orthoclaadiinae	2	0.64%	No	Larva	Damaged	6	CG
Orthoclaadiinae sp. (RAI Taxon # 0001)	1	0.32%	Yes	Larva		11	UN
<i>Orthocladius</i> sp.	4	1.27%	No	Pupa		6	CG
<i>Orthocladius</i> sp.	107	34.08%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	15	4.78%	Yes	Larva		1	CG
<i>Parorthocladius</i> sp.	1	0.32%	Yes	Larva		6	CG
<i>Tvetenia</i> Bavarica Gr.	25	7.96%	Yes	Larva		5	CG
Sample Count	314						

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR002

RAI No.: BWTF09GR002 Sta. Name: Gallatin River: North Fork of the West Fork REP
Client ID: NF 2
Date Coll.: 4/13/2009 No. Jars: 1 STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Ostracoda	1	0.32%	Yes	Unknown		8	CG
Enchytraeidae							
<i>Mesenchytraeus</i> sp.	52	16.46%	Yes	Unknown		4	CG
Planariidae							
<i>Polycelis coronata</i>	3	0.95%	Yes	Unknown		1	OM
Ephemeroptera							
Baetidae							
<i>Baetis</i> sp.	2	0.63%	No	Larva	Early Instar	5	CG
<i>Baetis bicaudatus</i>	4	1.27%	Yes	Larva		2	CG
Ephemerellidae							
<i>Drunella</i> sp.	36	11.39%	No	Larva	Early Instar	1	SC
<i>Drunella spinifera</i>	1	0.32%	Yes	Larva		0	PR
<i>Ephemerella inermis</i>	1	0.32%	Yes	Larva		4	SH
Heptageniidae							
<i>Cinygmula</i> sp.	1	0.32%	Yes	Larva		0	SC
<i>Rhithrogena</i> sp.	3	0.95%	Yes	Larva		0	CG
Plecoptera							
Leuctridae							
Leuctridae	1	0.32%	Yes	Larva	Damaged	0	SH
Nemouridae							
Nemouridae	78	24.68%	Yes	Larva	Early Instar	2	SH
<i>Zapada cinctipes</i>	2	0.63%	Yes	Larva		3	SH
Perlidae							
<i>Doroneuria</i> sp.	1	0.32%	Yes	Larva		0	PR
Perlodidae							
Perlodidae	4	1.27%	Yes	Larva	Early Instar	2	PR
Taeniopterygidae							
Taeniopterygidae	2	0.63%	Yes	Larva		2	SH
Trichoptera							
Lepidostomatidae							
<i>Lepidostoma</i> sp.	1	0.32%	Yes	Larva		1	SH
Limnephilidae							
<i>Ecclisomyia</i> sp.	1	0.32%	Yes	Larva		4	CG
Rhyacophilidae							
<i>Rhyacophila</i> sp.	3	0.95%	No	Larva	Early Instar	1	PR
<i>Rhyacophila narvae</i>	4	1.27%	Yes	Larva		0	PR
<i>Rhyacophila pellisa</i>	2	0.63%	Yes	Larva		0	PR
<i>Rhyacophila Vofixa</i> Gr.	1	0.32%	Yes	Larva		0	PR
Coleoptera							
Elmidae							
Elmidae	1	0.32%	No	Larva	Early Instar	4	CG
<i>Heterlimnius</i> sp.	1	0.32%	Yes	Larva		3	CG

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR002

RAI No.: BWTF09GR002

Sta. Name: Gallatin River: North Fork of the West Fork REP
2

Client ID: NF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Diptera							
Empididae							
<i>Wiedemannia</i> sp.	7	2.22%	Yes	Larva		6	PR
Pelecorhynchidae							
<i>Glutops</i> sp.	1	0.32%	Yes	Larva		1	PR
Psychodidae							
Psychodidae	9	2.85%	Yes	Larva		4	CG
Tipulidae							
<i>Dicranota</i> sp.	1	0.32%	Yes	Larva		3	PR
Chironomidae							
Chironomidae							
Chironomidae	4	1.27%	No	Pupa		10	CG
Eukiefferiella Gracei Gr.	7	2.22%	Yes	Larva		8	CG
<i>Micropsectra</i> sp.	2	0.63%	Yes	Larva		4	CG
Orthoclaadiinae	2	0.63%	Yes	Larva	Early Instar	6	CG
Orthoclaadiinae	1	0.32%	Yes	Larva	Damaged	6	CG
<i>Orthocladus</i> sp.	54	17.09%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	13	4.11%	Yes	Larva		1	CG
Tvetenia Bavarica Gr.	9	2.85%	Yes	Larva		5	CG
	Sample Count	316					

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR003

RAI No.: BWTF09GR003

Sta. Name: Gallatin River: South Fork of the West Fork
REP 1

Client ID: SF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	0.34%	Yes	Unknown		5	PR
Enchytraeidae							
<i>Mesenchytraeus</i> sp.	17	5.76%	Yes	Unknown		4	CG
Ephemeroptera							
Baetidae							
<i>Baetis</i> sp.	19	6.44%	Yes	Larva	Early Instar	5	CG
Ephemerellidae							
<i>Caudatella edmundsi</i>	1	0.34%	Yes	Larva		0	SC
<i>Drunella doddsii</i>	7	2.37%	Yes	Larva		1	SC
<i>Drunella grandis</i>	1	0.34%	Yes	Larva		2	PR
<i>Ephemerella inermis</i>	19	6.44%	Yes	Larva		4	SH
Ephemerellidae	6	2.03%	No	Larva	Early Instar	1	CG
Heptageniidae							
<i>Cinygmula</i> sp.	5	1.69%	Yes	Larva		0	SC
<i>Epeorus</i> sp.	2	0.68%	Yes	Larva	Early Instar	2	CG
Leptophlebiidae							
<i>Paraleptophlebia</i> sp.	1	0.34%	Yes	Larva		1	CG
Plecoptera							
Chloroperlidae							
<i>Sweltsa</i> sp.	2	0.68%	Yes	Larva		0	PR
Nemouridae							
Nemouridae	4	1.36%	Yes	Larva	Damaged	2	SH
<i>Zapada cinctipes</i>	1	0.34%	Yes	Larva		3	SH
Trichoptera							
Apataniidae							
Apataniidae	1	0.34%	Yes	Pupa		3	SC
Brachycentridae							
<i>Brachycentrus americanus</i>	13	4.41%	Yes	Larva		1	CF
<i>Micrasema</i> sp.	2	0.68%	Yes	Larva		1	SH
Glossosomatidae							
<i>Glossosoma</i> sp.	1	0.34%	Yes	Larva		0	SC
Hydropsychidae							
<i>Arctopsyche grandis</i>	4	1.36%	Yes	Larva		2	PR
Hydroptilidae							
<i>Hydroptila</i> sp.	1	0.34%	Yes	Larva		6	PH
Hydroptilidae	1	0.34%	No	Pupa		4	PH
Lepidostomatidae							
<i>Lepidostoma</i> sp.	3	1.02%	Yes	Larva		1	SH
Rhyacophilidae							
Rhyacophila Hyalinata Gr.	1	0.34%	Yes	Larva		0	PR
Coleoptera							
Dytiscidae							
<i>Oreodytes</i> sp.	1	0.34%	Yes	Adult		5	PR
Elmidae							
<i>Optioservus</i> sp.	1	0.34%	Yes	Larva		5	SC

Tuesday, June 23, 2009

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR003

RAI No.: BWTF09GR003

Sta. Name: Gallatin River: South Fork of the West Fork
REP 1

Client ID: SF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Diptera							
Athericidae							
<i>Atherix</i> sp.	2	0.68%	Yes	Larva		5	PR
Empididae							
<i>Wiedemannia</i> sp.	6	2.03%	Yes	Larva		6	PR
Psychodidae							
Psychodidae	33	11.19%	Yes	Larva		4	CG
Simuliidae							
<i>Prosimulium</i> sp.	1	0.34%	Yes	Larva		4	CF
Tipulidae							
<i>Dicranota</i> sp.	5	1.69%	Yes	Larva		3	PR
<i>Hexatoma</i> sp.	2	0.68%	Yes	Larva		2	PR
Chironomidae							
Chironomidae							
Eukiefferiella Devonica Gr.	5	1.69%	Yes	Larva		8	CG
Eukiefferiella Gracei Gr.	19	6.44%	Yes	Larva		8	CG
<i>Hydrobaenus</i> sp.	1	0.34%	Yes	Larva		8	SC
<i>Micropsectra</i> sp.	67	22.71%	Yes	Larva		4	CG
Orthoclaadiinae	6	2.03%	No	Larva	Early Instar	6	CG
<i>Orthocladus</i> sp.	10	3.39%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	7	2.37%	Yes	Larva		1	CG
Potthastia Gaedii Gr.	1	0.34%	Yes	Larva		2	CG
<i>Rheocricotopus</i> sp.	2	0.68%	Yes	Larva		4	CG
<i>Sublettea</i> sp.	3	1.02%	Yes	Larva		6	CF
Tvetenia Bavarica Gr.	10	3.39%	Yes	Larva		5	CG
	Sample Count	295					

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR004

RAI No.: BWTF09GR004

Sta. Name: Gallatin River: South Fork of the West Fork
REP 2

Client ID: SF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	3	0.91%	Yes	Unknown		5	PR
Enchytraeidae							
<i>Mesenchytraeus</i> sp.	8	2.44%	Yes	Unknown		4	CG
Ephemeroptera							
Baetidae							
<i>Baetis</i> sp.	13	3.96%	No	Larva	Early Instar	5	CG
<i>Baetis tricaudatus</i>	8	2.44%	Yes	Larva		4	CG
Ephemerellidae							
<i>Drunella doddsii</i>	2	0.61%	Yes	Larva		1	SC
<i>Drunella grandis</i>	2	0.61%	Yes	Larva		2	PR
<i>Ephemerella inermis</i>	44	13.41%	Yes	Larva		4	SH
Ephemerellidae	3	0.91%	No	Larva	Early Instar	1	CG
Heptageniidae							
<i>Cinygmula</i> sp.	17	5.18%	Yes	Larva		0	SC
<i>Epeorus longimanus</i>	10	3.05%	Yes	Larva		1	SC
<i>Rhithrogena</i> sp.	6	1.83%	Yes	Larva		0	CG
Plecoptera							
Chloroperlidae							
<i>Sweltsa</i> sp.	1	0.30%	Yes	Larva		0	PR
Nemouridae							
Nemouridae	4	1.22%	Yes	Larva	Early Instar	2	SH
<i>Zapada cinctipes</i>	7	2.13%	Yes	Larva		3	SH
Perlidae							
<i>Hesperoperla pacifica</i>	2	0.61%	Yes	Larva		1	PR
Perlodidae							
<i>Isoperla</i> sp.	1	0.30%	Yes	Larva		2	PR
Perlodidae	1	0.30%	No	Larva	Early Instar	2	PR
Trichoptera							
Brachycentridae							
<i>Brachycentrus americanus</i>	14	4.27%	Yes	Larva		1	CF
<i>Micrasema</i> sp.	1	0.30%	Yes	Larva		1	SH
Hydropsychidae							
<i>Arctopsyche grandis</i>	10	3.05%	Yes	Larva		2	PR
Hydroptilidae							
<i>Hydroptila</i> sp.	1	0.30%	Yes	Larva		6	PH
Hydroptilidae	1	0.30%	No	Pupa		4	PH
Lepidostomatidae							
<i>Lepidostoma</i> sp.	10	3.05%	Yes	Larva		1	SH
Uenoidae							
<i>Oligophlebodes</i> sp.	2	0.61%	Yes	Larva		3	SC
Coleoptera							
Elmidae							
<i>Optioservus</i> sp.	3	0.91%	Yes	Larva		5	SC

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR004

RAI No.: BWTF09GR004

Sta. Name: Gallatin River: South Fork of the West Fork
REP 2

Client ID: SF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Diptera							
Athericidae							
<i>Atherix</i> sp.	1	0.30%	Yes	Larva		5	PR
Psychodidae							
Psychodidae	27	8.23%	Yes	Larva		4	CG
Simuliidae							
<i>Simulium</i> sp.	2	0.61%	Yes	Larva		6	CF
Tipulidae							
<i>Dicranota</i> sp.	10	3.05%	Yes	Larva		3	PR
<i>Hexatoma</i> sp.	3	0.91%	Yes	Larva		2	PR
Chironomidae							
Chironomidae							
Chironomidae	1	0.30%	No	Pupa		10	CG
Eukiefferiella Devonica Gr.	2	0.61%	Yes	Larva		8	CG
Eukiefferiella Gracei Gr.	8	2.44%	Yes	Larva		8	CG
<i>Hydrobaenus</i> sp.	7	2.13%	Yes	Larva		8	SC
<i>Micropsectra</i> sp.	61	18.60%	Yes	Larva		4	CG
<i>Orthocladus</i> sp.	9	2.74%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	12	3.66%	Yes	Larva		1	CG
Potthastia Gaedii Gr.	6	1.83%	Yes	Larva		2	CG
<i>Stempellina</i> sp.	2	0.61%	Yes	Larva		2	CG
Tanytarsini	2	0.61%	No	Larva	Early Instar	6	CF
Tvetenia Bavarica Gr.	1	0.30%	Yes	Larva		5	CG
	Sample Count	328					

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR005

RAI No.: BWTF09GR005

Sta. Name: Gallatin River: Middle Fork of the West Fork
REP 1

Client ID: MF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	0.33%	Yes	Unknown		5	PR
Naididae							
<i>Nais</i> sp.	1	0.33%	Yes	Unknown		8	CG
Planariidae							
<i>Polycelis coronata</i>	1	0.33%	Yes	Unknown		1	OM
Ephemeroptera							
Baetidae							
<i>Baetis</i> sp.	2	0.66%	No	Larva	Early Instar	5	CG
<i>Baetis tricaudatus</i>	5	1.65%	Yes	Larva		4	CG
Ephemerellidae							
<i>Drunella</i> sp.	1	0.33%	No	Larva	Damaged	1	SC
<i>Drunella grandis</i>	9	2.97%	Yes	Larva		2	PR
<i>Ephemerella aurivillii</i>	1	0.33%	Yes	Larva		0	CG
<i>Ephemerella inermis</i>	8	2.64%	Yes	Larva		4	SH
Heptageniidae							
Heptageniidae	1	0.33%	Yes	Larva	Damaged	4	SC
Plecoptera							
Chloroperlidae							
<i>Sweltsa</i> sp.	3	0.99%	Yes	Larva		0	PR
Nemouridae							
Nemouridae	1	0.33%	No	Larva	Early Instar	2	SH
<i>Prostoia</i> sp.	3	0.99%	Yes	Larva		2	SH
Trichoptera							
Brachycentridae							
<i>Brachycentrus</i> sp.	1	0.33%	Yes	Larva	Damaged	1	CF
Glossosomatidae							
<i>Glossosoma</i> sp.	1	0.33%	Yes	Larva		0	SC
Hydropsychidae							
<i>Arctopsyche grandis</i>	4	1.32%	Yes	Larva		2	PR
Lepidostomatidae							
<i>Lepidostoma</i> sp.	1	0.33%	Yes	Larva		1	SH
Rhyacophilidae							
<i>Rhyacophila Coloradensis</i> Gr.	1	0.33%	Yes	Larva		0	PR
Uenoidae							
<i>Oligophlebodes</i> sp.	1	0.33%	Yes	Larva		3	SC
Coleoptera							
Elmidae							
<i>Heterlimnius</i> sp.	3	0.99%	Yes	Larva		3	CG
<i>Optioservus</i> sp.	9	2.97%	Yes	Larva		5	SC

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR005

RAI No.: BWTF09GR005

Sta. Name: Gallatin River: Middle Fork of the West Fork
REP 1

Client ID: MF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Diptera							
Athericidae							
<i>Atherix</i> sp.	2	0.66%	Yes	Larva		5	PR
Empididae							
<i>Wiedemannia</i> sp.	1	0.33%	Yes	Larva		6	PR
Psychodidae							
Psychodidae	3	0.99%	Yes	Larva		4	CG
Tipulidae							
<i>Dicranota</i> sp.	2	0.66%	Yes	Larva		3	PR
Chironomidae							
Chironomidae							
Chironomidae	127	41.91%	No	Pupa		10	CG
<i>Diamesa</i> sp.	1	0.33%	Yes	Larva		5	CG
<i>Eukiefferiella</i> Gracei Gr.	31	10.23%	Yes	Larva		8	CG
<i>Hydrobaenus</i> sp.	14	4.62%	Yes	Larva		8	SC
<i>Micropsectra</i> sp.	15	4.95%	Yes	Larva		4	CG
<i>Orthocladius</i> sp.	25	8.25%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	9	2.97%	Yes	Larva		1	CG
<i>Polypedilum</i> sp.	2	0.66%	Yes	Larva		6	SH
<i>Potthastia</i> Gaedii Gr.	10	3.30%	Yes	Larva		2	CG
<i>Stictochironomus</i> sp.	3	0.99%	Yes	Larva		5	CG
	Sample Count	303					

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR006

RAI No.: BWTF09GR006

Sta. Name: Gallatin River: Middle Fork of the West Fork
REP 2

Client ID: MF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Ostracoda	1	0.31%	Yes	Unknown		8	CG
Naididae							
<i>Nais</i> sp.	4	1.25%	Yes	Unknown		8	CG
Ephemeroptera							
Baetidae							
<i>Baetis tricaudatus</i>	19	5.96%	Yes	Larva		4	CG
Ephemerellidae							
<i>Drunella doddsii</i>	1	0.31%	Yes	Larva		1	SC
<i>Drunella grandis</i>	4	1.25%	Yes	Larva		2	PR
<i>Ephemerella inermis</i>	10	3.13%	Yes	Larva		4	SH
Heptageniidae							
<i>Epeorus longimanus</i>	1	0.31%	Yes	Larva		1	SC
Leptophlebiidae							
<i>Paraleptophlebia</i> sp.	1	0.31%	Yes	Larva		1	CG
Plecoptera							
Nemouridae							
<i>Podmosta</i> sp.	5	1.57%	Yes	Larva		2	SH
Trichoptera							
Brachycentridae							
<i>Brachycentrus americanus</i>	4	1.25%	Yes	Larva		1	CF
Hydropsychidae							
<i>Arctopsyche grandis</i>	2	0.63%	Yes	Larva		2	PR
Lepidostomatidae							
<i>Lepidostoma</i> sp.	3	0.94%	Yes	Larva		1	SH
Rhyacophilidae							
<i>Rhyacophila</i> sp.	1	0.31%	No	Larva	Damaged	1	PR
<i>Rhyacophila Hyalinata</i> Gr.	6	1.88%	Yes	Larva		0	PR
Uenoidae							
<i>Oligophlebodes</i> sp.	4	1.25%	Yes	Larva		3	SC
Uenoidae	1	0.31%	No	Larva	Early Instar	0	SC
Coleoptera							
Elmidae							
<i>Heterlimnius</i> sp.	2	0.63%	Yes	Adult		3	CG
<i>Heterlimnius</i> sp.	4	1.25%	No	Larva		3	CG
<i>Optioservus</i> sp.	2	0.63%	Yes	Larva		5	SC
Diptera							
Empididae							
<i>Wiedemannia</i> sp.	1	0.31%	Yes	Larva		6	PR
Tipulidae							
<i>Dicranota</i> sp.	2	0.63%	Yes	Larva		3	PR

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR006

RAI No.: BWTF09GR006

Sta. Name: Gallatin River: Middle Fork of the West Fork
REP 2

Client ID: MF

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Chironomidae							
Chironomidae							
Chironomidae	5	1.57%	No	Pupa		10	CG
<i>Diamesa</i> sp.	1	0.31%	Yes	Larva		5	CG
<i>Eukiefferiella</i> Devonica Gr.	7	2.19%	Yes	Larva		8	CG
<i>Eukiefferiella</i> Gracei Gr.	44	13.79%	Yes	Larva		8	CG
<i>Hydrobaenus</i> sp.	5	1.57%	Yes	Larva		8	SC
<i>Micropsectra</i> sp.	124	38.87%	Yes	Larva		4	CG
Orthoclaadiinae	1	0.31%	No	Larva	Early Instar	6	CG
<i>Orthocladus</i> sp.	38	11.91%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	10	3.13%	Yes	Larva		1	CG
<i>Stempellina</i> sp.	1	0.31%	Yes	Larva		2	CG
<i>Stictochironomus</i> sp.	1	0.31%	Yes	Larva		5	CG
<i>Sublettea</i> sp.	1	0.31%	Yes	Larva		6	CF
<i>Tvetenia</i> Bavarica Gr.	3	0.94%	Yes	Larva		5	CG
Sample Count	319						

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR007

RAI No.: BWTF09GR007

Sta. Name: West Fork of the Gallatin River upstream of Big Sky Spur Rd. bridge REP 1

Client ID: WEST

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	4	1.30%	Yes	Unknown		5	PR
Enchytraeidae							
<i>Mesenchytraeus</i> sp.	1	0.33%	Yes	Unknown		4	CG
Naididae							
<i>Nais</i> sp.	1	0.33%	Yes	Unknown		8	CG
Planariidae							
<i>Polycelis coronata</i>	3	0.98%	Yes	Unknown		1	OM
Ephemeroptera							
Baetidae							
<i>Baetis tricaudatus</i>	1	0.33%	Yes	Larva		4	CG
Ephemerellidae							
<i>Drunella doddsii</i>	2	0.65%	Yes	Larva		1	SC
<i>Drunella grandis</i>	8	2.61%	Yes	Larva		2	PR
<i>Ephemerella inermis</i>	18	5.86%	Yes	Larva		4	SH
Ephemerellidae	1	0.33%	No	Larva	Early Instar	1	CG
Heptageniidae							
<i>Cinygmula</i> sp.	5	1.63%	Yes	Larva		0	SC
<i>Rhithrogena</i> sp.	1	0.33%	Yes	Larva		0	CG
Plecoptera							
Chloroperlidae							
<i>Sweltsa</i> sp.	2	0.65%	Yes	Larva		0	PR
Nemouridae							
Nemouridae	2	0.65%	No	Larva	Early Instar	2	SH
<i>Podmosta</i> sp.	2	0.65%	Yes	Larva		2	SH
<i>Zapada cinctipes</i>	1	0.33%	Yes	Larva		3	SH
Perlidae							
<i>Hesperoperla pacifica</i>	1	0.33%	Yes	Larva		1	PR
Perlodidae							
<i>Skwala</i> sp.	1	0.33%	Yes	Larva		3	PR
Trichoptera							
Brachycentridae							
<i>Brachycentrus americanus</i>	3	0.98%	Yes	Larva		1	CF
<i>Micrasema</i> sp.	1	0.33%	Yes	Larva		1	SH
Glossosomatidae							
<i>Glossosoma</i> sp.	2	0.65%	Yes	Larva		0	SC
Hydropsychidae							
<i>Arctopsyche grandis</i>	1	0.33%	Yes	Larva		2	PR
Lepidostomatidae							
<i>Lepidostoma</i> sp.	6	1.95%	Yes	Larva		1	SH
Rhyacophilidae							
Rhyacophila Hyalinata Gr.	1	0.33%	Yes	Larva		0	PR
Coleoptera							
Elmidae							
<i>Optioservus</i> sp.	2	0.65%	No	Larva		5	SC
<i>Optioservus</i> sp.	3	0.98%	Yes	Adult		5	SC

Tuesday, June 23, 2009

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR007

RAI No.: BWTF09GR007

Sta. Name: West Fork of the Gallatin River upstream of Big Sky Spur Rd. bridge REP 1

Client ID: WEST

Date Coll.: 4/13/2009

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Diptera							
Athericidae							
<i>Atherix</i> sp.	18	5.86%	Yes	Larva		5	PR
Psychodidae							
Psychodidae	5	1.63%	Yes	Larva		4	CG
Tipulidae							
<i>Antocha</i> sp.	1	0.33%	Yes	Larva		3	CG
<i>Dicranota</i> sp.	1	0.33%	Yes	Larva		3	PR
<i>Hexatoma</i> sp.	1	0.33%	Yes	Larva		2	PR
Chironomidae							
Chironomidae							
Chironomidae	2	0.65%	No	Pupa		10	CG
<i>Diamesa</i> sp.	2	0.65%	Yes	Larva		5	CG
<i>Eukiefferiella</i> sp.	2	0.65%	No	Larva	Early Instar	8	CG
<i>Eukiefferiella</i> Gracei Gr.	42	13.68%	Yes	Larva		8	CG
<i>Micropsectra</i> sp.	115	37.46%	Yes	Larva		4	CG
<i>Orthocladius</i> sp.	25	8.14%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	17	5.54%	Yes	Larva		1	CG
<i>Potthastia</i> Gaedii Gr.	3	0.98%	Yes	Larva		2	CG
	Sample Count	307					

Taxa Listing

Project ID: BWTF09GR
RAI No.: BWTF09GR008

RAI No.: BWTF09GR008 Sta. Name: West Fork of the Gallatin River upstream of Big Sky Spur Rd. bridge REP 2
Client ID: WEST
Date Coll.: 4/13/2009 No. Jars: 1 STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	3	0.88%	Yes	Unknown		5	PR
Naididae							
<i>Nais</i> sp.	1	0.29%	Yes	Unknown		8	CG
Ephemeroptera							
Baetidae							
<i>Baetis tricaudatus</i>	2	0.59%	Yes	Larva		4	CG
Ephemerellidae							
<i>Drunella doddsii</i>	1	0.29%	Yes	Larva		1	SC
<i>Drunella grandis</i>	2	0.59%	Yes	Larva		2	PR
<i>Ephemerella inermis</i>	11	3.23%	Yes	Larva		4	SH
Ephemerellidae	1	0.29%	No	Larva	Early Instar	1	CG
Heptageniidae							
<i>Cinygmula</i> sp.	5	1.47%	Yes	Larva		0	SC
Plecoptera							
Nemouridae							
<i>Podmosta</i> sp.	9	2.64%	Yes	Larva		2	SH
Trichoptera							
Brachycentridae							
<i>Brachycentrus americanus</i>	3	0.88%	Yes	Larva		1	CF
Hydropsychidae							
<i>Arctopsyche grandis</i>	2	0.59%	Yes	Larva		2	PR
Lepidostomatidae							
<i>Lepidostoma</i> sp.	2	0.59%	Yes	Larva		1	SH
Diptera							
Athericidae							
<i>Atherix</i> sp.	6	1.76%	Yes	Larva		5	PR
Tipulidae							
<i>Hexatoma</i> sp.	1	0.29%	Yes	Larva		2	PR
Chironomidae							
Chironomidae							
<i>Cladotanytarsus</i> sp.	2	0.59%	Yes	Larva		7	CG
Eukiefferiella Gracei Gr.	45	13.20%	Yes	Larva		8	CG
<i>Hydrobaenus</i> sp.	4	1.17%	Yes	Larva		8	SC
<i>Micropsectra</i> sp.	129	37.83%	Yes	Larva		4	CG
Orthoclaadiinae	1	0.29%	No	Larva	Early Instar	6	CG
<i>Orthocladus</i> sp.	90	26.39%	Yes	Larva		6	CG
<i>Pagastia</i> sp.	5	1.47%	Yes	Larva		1	CG
Potthastia Gaedii Gr.	3	0.88%	Yes	Larva		2	CG
Tvetenia Bavarica Gr.	13	3.81%	Yes	Larva		5	CG
	Sample Count	341					

Metrics Report

Project ID: BWTF09GR
 RAI No.: BWTF09GR001
 Sta. Name: Gallatin River: North Fork of the West Fork REP 1
 Client ID: NF
 STORET ID
 Coll. Date: 4/13/2009

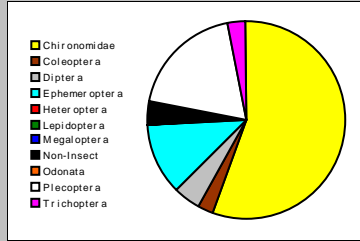
Abundance Measures

Sample Count: 314
 Sample Abundance: 9,420.00 3.33% of sample used

Coll. Procedure: KICK
 Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	12	3.82%
Odonata			
Ephemeroptera	5	37	11.78%
Plecoptera	6	60	19.11%
Heteroptera			
Megaloptera			
Trichoptera	2	10	3.18%
Lepidoptera			
Coleoptera	1	7	2.23%
Diptera	4	14	4.46%
Chironomidae	7	174	55.41%

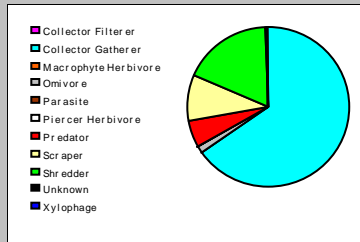


Dominant Taxa

Category	A	PRA
Orthocladus	111	35.35%
Prostia	40	12.74%
Drunella	27	8.60%
Tvetenia Bavarica Gr.	25	7.96%
Paqastia	15	4.78%
Nemouridae	12	3.82%
Eukiefferiella Gracei Gr.	11	3.50%
Psychodidae	10	3.18%
Mesenchytraeus	8	2.55%
Rhyacophila Betteni Gr.	6	1.91%
Rhithroena	6	1.91%
Heterlimnius	6	1.91%
Micropsectra	5	1.59%
Polycelis coronata	4	1.27%
Eukiefferiella	3	0.96%

Functional Composition

Category	R	A	PRA
Predator	7	18	5.73%
Parasite			
Collector Gatherer	10	205	65.29%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	3	29	9.24%
Shredder	5	57	18.15%
Omnivore	1	4	1.27%
Unknown	1	1	0.32%

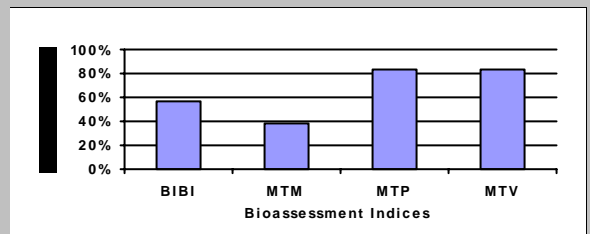


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	27	3	3		2
Non-Insect Percent	3.82%				
E Richness	5	3		2	
P Richness	6	3		3	
T Richness	2	1		1	
EPT Richness	13		3		0
EPT Percent	34.08%		2		0
Oligochaeta+Hirudinea Percent	2.55%				
Baetidae/Ephemeroptera	0.00%				
Hydropsychidae/Trichoptera	0.10%				
<i>Dominance</i>					
Dominant Taxa Percent	35.35%		2		1
Dominant Taxa (2) Percent	48.09%				
Dominant Taxa (3) Percent	56.69%	3			
Dominant Taxa (10) Percent	84.39%				
<i>Diversity</i>					
Shannon H (loge)	2.276				
Shannon H (log2)	3.283		3		
Margalef D	4.591				
Simpson D	0.179				
Evenness	0.074				
<i>Function</i>					
Predator Richness	7		3		
Predator Percent	5.73%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	65.29%		2		2
Scraper+Shredder Percent	27.39%		2		1
Scraper/Filterer	0.00%				
Scraper/Scraper+Filterer	0.00%				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	0.96%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	9	1			
Clinger Percent	17.52%				
<i>Characteristics</i>					
Cold Stenotherm Richness	4				
Cold Stenotherm Percent	1.59%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	1				
Air Breather Percent	3.18%				
<i>Voltinism</i>					
Univoltine Richness	16				
Semivoltine Richness	3	3			
Multivoltine Percent	56.37%		2		
<i>Tolerance</i>					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	1				
Sediment Sensitive Percent	0.32%				
Metals Tolerance Index	4.801				
Pollution Sensitive Richness	5	5		3	
Pollution Tolerant Percent	0.00%	5		3	
Hilsenhoff Biotic Index	3.888		3		2
Intolerant Percent	40.13%				
Supertolerant Percent	4.46%				
CTQa	61.905				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	28	56.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	25	83.33%	None
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	15	83.33%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	8	38.10%	Moderate



Metrics Report

Project ID: BWTF09GR
 RAI No.: BWTF09GR002
 Sta. Name: Gallatin River: North Fork of the West Fork REP 2
 Client ID: NF
 STORET ID
 Coll. Date: 4/13/2009

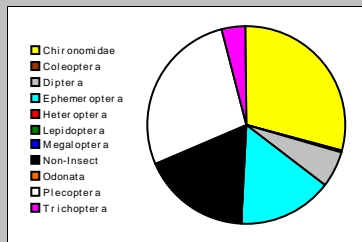
Abundance Measures

Sample Count: 316
 Sample Abundance: 9,480.00 3.33% of sample used

Coll. Procedure: KICK
 Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	56	17.72%
Odonata			
Ephemeroptera	5	48	15.19%
Plecoptera	6	88	27.85%
Heteroptera			
Megaloptera			
Trichoptera	5	12	3.80%
Lepidoptera			
Coleoptera	1	2	0.63%
Diptera	4	18	5.70%
Chironomidae	7	92	29.11%

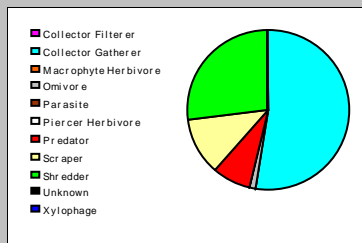


Dominant Taxa

Category	A	PRA
Nemouridae	78	24.68%
Orthocladus	54	17.09%
Mesenchytraeus	52	16.46%
Drunella	36	11.39%
Paqastia	13	4.11%
Tvetenia Bavarica Gr.	9	2.85%
Psychodidae	9	2.85%
Wiedemannia	7	2.22%
Eukiefferiella Gracei Gr.	7	2.22%
Rhyacophila narvae	4	1.27%
Perlodidae	4	1.27%
Chironomidae	4	1.27%
Baetis bicaudatus	4	1.27%
Rhyacophila	3	0.95%
Rhithrogena	3	0.95%

Functional Composition

Category	R	A	PRA
Predator	9	25	7.91%
Parasite			
Collector Gatherer	14	166	52.53%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	1	37	11.71%
Shredder	6	85	26.90%
Omnivore	1	3	0.95%
Unknown			

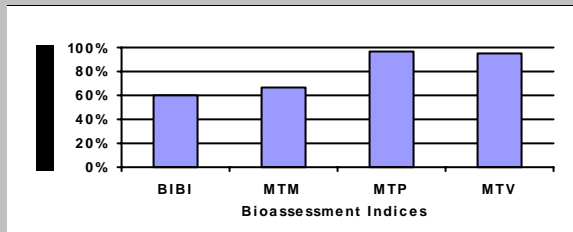


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	31	3	3		3
Non-Insect Percent	17.72%				
E Richness	5	3		2	
P Richness	6	3		3	
T Richness	5	3		3	
EPT Richness	16		3		1
EPT Percent	46.84%		2		1
Oligochaeta+Hirudinea Percent	16.46%				
Baetidae/Ephemeroptera	0.125				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxa Percent	24.68%		3		3
Dominant Taxa (2) Percent	41.77%				
Dominant Taxa (3) Percent	58.23%	3			
Dominant Taxa (10) Percent	85.13%				
<i>Diversity</i>					
Shannon H (loge)	2.291				
Shannon H (log2)	3.306		3		
Margalef D	5.418				
Simpson D	0.165				
Evenness	0.074				
<i>Function</i>					
Predator Richness	9		3		
Predator Percent	7.91%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	52.53%		3		3
Scraper+Shredder Percent	38.61%		3		1
Scraper/Filterer	0.00%				
Scraper/Scraper+Filterer	0.00%				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	1.90%				
Swimmer Richness	1				
Swimmer Percent	1.90%				
Clinger Richness	11	3			
Clinger Percent	20.89%				
<i>Characteristics</i>					
Cold Stenotherm Richness	7				
Cold Stenotherm Percent	3.16%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	2				
Air Breather Percent	3.16%				
<i>Volturnism</i>					
Univoltine Richness	19				
Semivoltine Richness	2	1			
Multivoltine Percent	32.28%		3		
<i>Tolerance</i>					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	0.32%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.793				
Pollution Sensitive Richness	8	5		3	
Pollution Tolerant Percent	0.00%	5		3	
Hilsenhoff Biotic Index	3.329		3		2
Intolerant Percent	50.32%				
Supertolerant Percent	3.80%				
CTQa	62.346				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	30	60.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	29	96.67%	None
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	17	94.44%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	14	66.67%	Slight



Metrics Report

Project ID: BWTF09GR
 RAI No.: BWTF09GR003
 Sta. Name: Gallatin River: South Fork of the West Fork REP 1
 Client ID: SF
 STORET ID
 Coll. Date: 4/13/2009

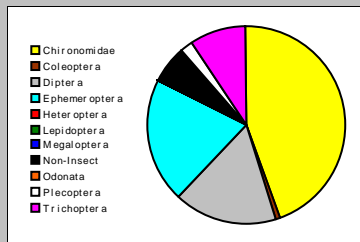
Abundance Measures

Sample Count: 295
 Sample Abundance: 2,212.50 13.33% of sample used

Coll. Procedure: KICK
 Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	18	6.10%
Odonata			
Ephemeroptera	8	61	20.68%
Plecoptera	3	7	2.37%
Heteroptera			
Megaloptera			
Trichoptera	8	27	9.15%
Lepidoptera			
Coleoptera	2	2	0.68%
Diptera	6	49	16.61%
Chironomidae	10	131	44.41%

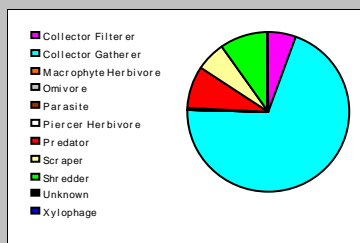


Dominant Taxa

Category	A	PRA
Micropsectra	67	22.71%
Psychodidae	33	11.19%
Eukiefferiella Gracei Gr.	19	6.44%
Ephemerella inermis	19	6.44%
Baetis	19	6.44%
Mesenchytraeus	17	5.76%
Brachycentrus americanus	13	4.41%
Tvetenia Bavarica Gr.	10	3.39%
Orthocladus	10	3.39%
Paqastia	7	2.37%
Drunella doddsii	7	2.37%
Wiedemannia	6	2.03%
Orthocladiinae	6	2.03%
Ephemerellidae	6	2.03%
Cinygmula	5	1.69%

Functional Composition

Category	R	A	PRA
Predator	10	25	8.47%
Parasite			
Collector Gatherer	13	205	69.49%
Collector Filterer	3	17	5.76%
Macrophyte Herbivore			
Piercer Herbivore	1	2	0.68%
Xylophage			
Scraper	7	17	5.76%
Shredder	5	29	9.83%
Omnivore			
Unknown			

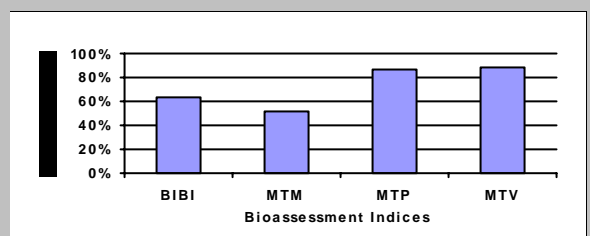


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	39	3	3		3
Non-Insect Percent	6.10%				
E Richness	8	3		3	
P Richness	3	1		2	
T Richness	8	3		3	
EPT Richness	19		3		2
EPT Percent	32.20%		2		0
Oligochaeta+Hirudinea Percent	5.76%				
Baetidae/Ephemeroptera	0.311				
Hydropsychidae/Trichoptera	0.148				
<i>Dominance</i>					
Dominant Taxon Percent	22.71%		3		3
Dominant Taxa (2) Percent	33.90%				
Dominant Taxa (3) Percent	40.34%	5			
Dominant Taxa (10) Percent	72.54%				
<i>Diversity</i>					
Shannon H (loge)	2.874				
Shannon H (log2)	4.146		3		
Margalef D	6.735				
Simpson D	0.093				
Evenness	0.051				
<i>Function</i>					
Predator Richness	10		3		
Predator Percent	8.47%	1			
Filterer Richness	3				
Filterer Percent	5.76%			2	
Collector Percent	75.25%		2		1
Scraper+Shredder Percent	15.59%		2		0
Scraper/Filterer	1.000				
Scraper/Scraper+Filterer	0.500				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	2.37%				
Swimmer Richness	3				
Swimmer Percent	7.12%				
Clinger Richness	15	3			
Clinger Percent	24.41%				
<i>Characteristics</i>					
Cold Stenotherm Richness	3				
Cold Stenotherm Percent	3.05%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	4				
Air Breather Percent	13.90%				
<i>Voltinism</i>					
Univoltine Richness	21				
Semivoltine Richness	4	3			
Multivoltine Percent	51.86%		2		
<i>Tolerance</i>					
Sediment Tolerant Richness	2				
Sediment Tolerant Percent	2.37%				
Sediment Sensitive Richness	2				
Sediment Sensitive Percent	1.69%				
Metals Tolerance Index	2.643				
Pollution Sensitive Richness	5	5		3	
Pollution Tolerant Percent	1.36%	5		3	
Hilsenhoff Biotic Index	3.980		3		2
Intolerant Percent	21.36%				
Supertolerant Percent	8.47%				
CTQa	60.455				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	32	64.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	26	86.67%	None
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	16	88.89%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	11	52.38%	Moderate



Metrics Report

Project ID: BWTF09GR
 RAI No.: BWTF09GR004
 Sta. Name: Gallatin River: South Fork of the West Fork REP 2
 Client ID: SF
 STORET ID
 Coll. Date: 4/13/2009

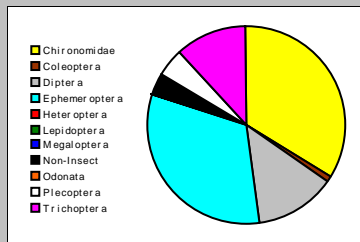
Abundance Measures

Sample Count: 328
 Sample Abundance: 2,460.00 13.33% of sample used

Coll. Procedure: KICK
 Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	11	3.35%
Odonata			
Ephemeroptera	7	105	32.01%
Plecoptera	5	16	4.88%
Heteroptera			
Megaloptera			
Trichoptera	6	39	11.89%
Lepidoptera			
Coleoptera	1	3	0.91%
Diptera	5	43	13.11%
Chironomidae	9	111	33.84%

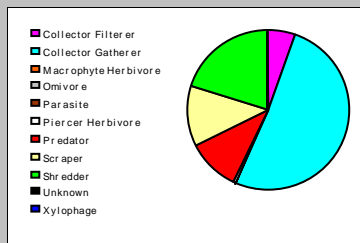


Dominant Taxa

Category	A	PRA
Micropsectra	61	18.60%
Ephemerella inermis	44	13.41%
Psychodidae	27	8.23%
Cinyamula	17	5.18%
Brachycentrus americanus	14	4.27%
Baetis	13	3.96%
Paqastia	12	3.66%
Lepidostoma	10	3.05%
Epeorus londimanus	10	3.05%
Dicranota	10	3.05%
Arctopsyche grandis	10	3.05%
Orthocladius	9	2.74%
Mesenchytraeus	8	2.44%
Eukiefferiella Gracei Gr.	8	2.44%
Baetis tricaudatus	8	2.44%

Functional Composition

Category	R	A	PRA
Predator	9	34	10.37%
Parasite			
Collector Gatherer	12	167	50.91%
Collector Filterer	2	18	5.49%
Macrophyte Herbivore			
Piercer Herbivore	1	2	0.61%
Xylophage			
Scraper	6	41	12.50%
Shredder	5	66	20.12%
Omnivore			
Unknown			

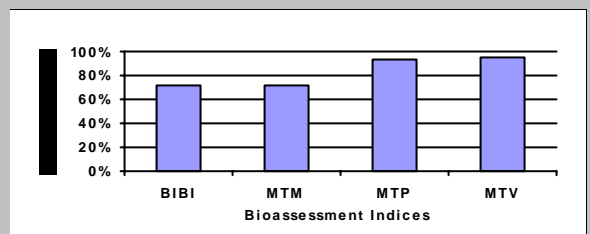


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	35	3	3		3
Non-Insect Percent	3.35%				
E Richness	7	3		3	
P Richness	5	3		3	
T Richness	6	3		3	
EPT Richness	18		3		2
EPT Percent	48.78%		2		1
Oligochaeta+Hirudinea Percent	2.44%				
Baetidae/Ephemeroptera	0.200				
Hydropsychidae/Trichoptera	0.256				
<i>Dominance</i>					
Dominant Taxon Percent	18.60%		3		3
Dominant Taxa (2) Percent	32.01%				
Dominant Taxa (3) Percent	40.24%	5			
Dominant Taxa (10) Percent	66.46%				
<i>Diversity</i>					
Shannon H (loge)	2.936				
Shannon H (log2)	4.235		3		
Margalef D	5.937				
Simpson D	0.081				
Evenness	0.050				
<i>Function</i>					
Predator Richness	9		3		
Predator Percent	10.37%	3			
Filterer Richness	2				
Filterer Percent	5.49%			2	
Collector Percent	56.40%		3		3
Scraper+Shredder Percent	32.62%		3		1
Scraper/Filterer	2.278				
Scraper/Scraper+Filterer	0.695				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	4.27%				
Swimmer Richness	1				
Swimmer Percent	6.40%				
Clinger Richness	12	3			
Clinger Percent	35.67%				
<i>Characteristics</i>					
Cold Stenotherm Richness	2				
Cold Stenotherm Percent	1.22%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	3				
Air Breather Percent	12.20%				
<i>Voltinism</i>					
Univoltine Richness	19				
Semivoltine Richness	4	3			
Multivoltine Percent	41.77%		2		
<i>Tolerance</i>					
Sediment Tolerant Richness	2				
Sediment Tolerant Percent	3.96%				
Sediment Sensitive Richness	1				
Sediment Sensitive Percent	3.05%				
Metals Tolerance Index	2.655				
Pollution Sensitive Richness	5	5			3
Pollution Tolerant Percent	1.52%	5			3
Hilsenhoff Biotic Index	3.354		3		2
Intolerant Percent	32.62%				
Supertolerant Percent	5.49%				
CTQa	56.656				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	36	72.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	28	93.33%	None
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	17	94.44%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	15	71.43%	Slight



Metrics Report

Project ID: BWTF09GR
RAI No.: BWTF09GR005
Sta. Name: Gallatin River: Middle Fork of the West Fork REP 1
Client ID: MF
STORET ID
Coll. Date: 4/13/2009

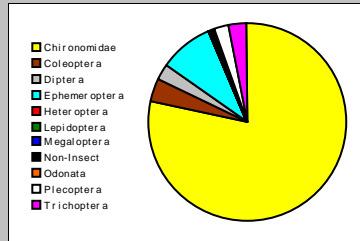
Abundance Measures

Sample Count: 303
Sample Abundance: 6,060.00 5.00% of sample used

Coll. Procedure: KICK
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	3	0.99%
Odonata			
Ephemeroptera	5	27	8.91%
Plecoptera	2	7	2.31%
Heteroptera			
Megaloptera			
Trichoptera	6	9	2.97%
Lepidoptera			
Coleoptera	2	12	3.96%
Diptera	4	8	2.64%
Chironomidae	9	237	78.22%

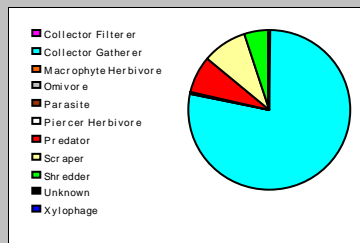


Dominant Taxa

Category	A	PRA
Chironomidae	127	41.91%
Eukiefferiella Gracei Gr.	31	10.23%
Orthocladus	25	8.25%
Micropsectra	15	4.95%
Hydrobaenus	14	4.62%
Potthastia Gaedii Gr.	10	3.30%
Paqastia	9	2.97%
Optioservus	9	2.97%
Drunella grandis	9	2.97%
Ephemerella inermis	8	2.64%
Baetis tricaudatus	5	1.65%
Arctopsyche grandis	4	1.32%
Sweltsa	3	0.99%
Psychodidae	3	0.99%
Prostoia	3	0.99%

Functional Composition

Category	R	A	PRA
Predator	8	23	7.59%
Parasite			
Collector Gatherer	12	236	77.89%
Collector Filterer	1	1	0.33%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	5	27	8.91%
Shredder	4	15	4.95%
Omnivore	1	1	0.33%
Unknown			

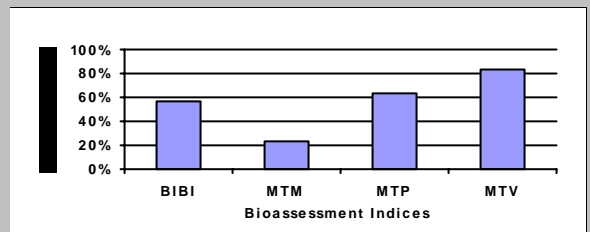


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	31	3	3		3
Non-Insect Percent	0.99%				
E Richness	5	3		2	
P Richness	2	1		2	
T Richness	6	3		3	
EPT Richness	13		3		0
EPT Percent	14.19%		1		0
Oligochaeta+Hirudinea Percent	0.33%				
Baetidae/Ephemeroptera	0.259				
Hydropsychidae/Trichoptera	0.444				
<i>Dominance</i>					
Dominant Taxon Percent	41.91%		2		1
Dominant Taxa (2) Percent	52.15%				
Dominant Taxa (3) Percent	60.40%	3			
Dominant Taxa (10) Percent	84.82%				
<i>Diversity</i>					
Shannon H (loge)	2.835				
Shannon H (log2)	4.090		3		
Margalef D	5.828				
Simpson D	0.080				
Evenness	0.054				
<i>Function</i>					
Predator Richness	8		3		
Predator Percent	7.59%	1			
Filterer Richness	1				
Filterer Percent	0.33%			3	
Collector Percent	78.22%		2		1
Scraper+Shredder Percent	13.86%		1		0
Scraper/Filterer	27.000				
Scraper/Scraper+Filterer	0.964				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	43.56%				
Swimmer Richness	1				
Swimmer Percent	2.31%				
Clinger Richness	12	3			
Clinger Percent	13.86%				
<i>Characteristics</i>					
Cold Stenotherm Richness	1				
Cold Stenotherm Percent	0.33%				
Hemoglobin Bearer Richness	2				
Hemoglobin Bearer Percent	1.65%				
Air Breather Richness	2				
Air Breather Percent	1.65%				
<i>Voltinism</i>					
Univoltine Richness	15				
Semivoltine Richness	4	3			
Multivoltine Percent	81.19%			0	
<i>Tolerance</i>					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	0.66%				
Sediment Sensitive Richness	2				
Sediment Sensitive Percent	1.65%				
Metals Tolerance Index	4.000				
Pollution Sensitive Richness	3	3			2
Pollution Tolerant Percent	4.62%	5			3
Hilsenhoff Biotic Index	6.960		1		0
Intolerant Percent	15.18%				
Supertolerant Percent	57.10%				
CTQa	65.893				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	28	56.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	19	63.33%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	15	83.33%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	5	23.81%	Moderate



Metrics Report

Project ID: BWTF09GR
RAI No.: BWTF09GR006
Sta. Name: Gallatin River: Middle Fork of the West Fork REP 2
Client ID: MF
STORET ID
Coll. Date: 4/13/2009

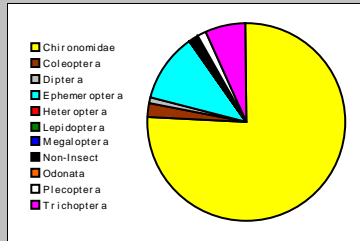
Abundance Measures

Sample Count: 319
Sample Abundance: 6,380.00 5.00% of sample used

Coll. Procedure: KICK
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	5	1.57%
Odonata			
Ephemeroptera	6	36	11.29%
Plecoptera	1	5	1.57%
Heteroptera			
Megaloptera			
Trichoptera	5	21	6.58%
Lepidoptera			
Coleoptera	2	8	2.51%
Diptera	2	3	0.94%
Chironomidae	11	241	75.55%

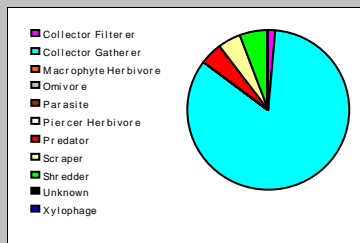


Dominant Taxa

Category	A	PRA
Micropsectra	124	38.87%
Eukiefferiella Gracei Gr.	44	13.79%
Orthocladus	38	11.91%
Baetis tricaudatus	19	5.96%
Paqastia	10	3.13%
Ephemerella inermis	10	3.13%
Eukiefferiella Devonica Gr.	7	2.19%
Rhyacophila Hyalinata Gr.	6	1.88%
Heterlimnius	6	1.88%
Podmosta	5	1.57%
Hydrobaenus	5	1.57%
Chironomidae	5	1.57%
Oligophlebodes	4	1.25%
Nais	4	1.25%
Drunella grandis	4	1.25%

Functional Composition

Category	R	A	PRA
Predator	5	16	5.02%
Parasite			
Collector Gatherer	14	266	83.39%
Collector Filterer	2	5	1.57%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	5	14	4.39%
Shredder	3	18	5.64%
Omnivore			
Unknown			

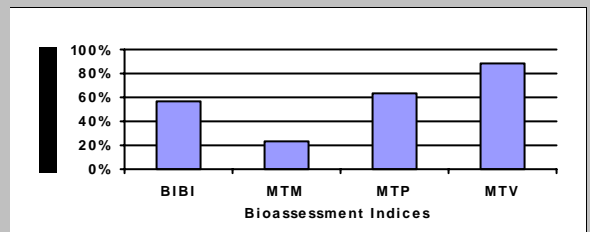


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	29	3	3		3
Non-Insect Percent	1.57%				
E Richness	6	3		3	
P Richness	1	1		1	
T Richness	5	3		3	
EPT Richness	12		3		0
EPT Percent	19.44%		1		0
Oligochaeta+Hirudinea Percent	1.25%				
Baetidae/Ephemeroptera	0.528				
Hydropsychidae/Trichoptera	0.095				
<i>Dominance</i>					
Dominant Taxa Percent	38.87%		2		1
Dominant Taxa (2) Percent	52.66%				
Dominant Taxa (3) Percent	64.58%	3			
Dominant Taxa (10) Percent	84.33%				
<i>Diversity</i>					
Shannon H (loge)	2.211				
Shannon H (log2)	3.190		3		
Margalef D	4.889				
Simpson D	0.205				
Evenness	0.074				
<i>Function</i>					
Predator Richness	5		2		
Predator Percent	5.02%	1			
Filterer Richness	2				
Filterer Percent	1.57%			3	
Collector Percent	84.95%		1		0
Scraper+Shredder Percent	10.03%		1		0
Scraper/Filterer	2.800				
Scraper/Scraper+Filterer	0.737				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	2.51%				
Swimmer Richness	2				
Swimmer Percent	6.27%				
Clinger Richness	10	1			
Clinger Percent	11.91%				
<i>Characteristics</i>					
Cold Stenotherm Richness	2				
Cold Stenotherm Percent	1.57%				
Hemoglobin Bearer Richness	1				
Hemoglobin Bearer Percent	0.31%				
Air Breather Richness	1				
Air Breather Percent	0.63%				
<i>Voltinism</i>					
Univoltine Richness	12				
Semivoltine Richness	4	3			
Multivoltine Percent	81.82%			0	
<i>Tolerance</i>					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	0.63%				
Sediment Sensitive Richness	1				
Sediment Sensitive Percent	0.63%				
Metals Tolerance Index	2.645				
Pollution Sensitive Richness	4	5		3	
Pollution Tolerant Percent	0.94%	5		3	
Hilsenhoff Biotic Index	4.740		3		1
Intolerant Percent	12.54%				
Supertolerant Percent	20.69%				
CTQa	68.080				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	28	56.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	19	63.33%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	16	88.89%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	5	23.81%	Moderate



Metrics Report

Project ID: BWTF09GR
RAI No.: BWTF09GR007
Sta. Name: West Fork of the Gallatin River upstream of Big Sky Spur Rd. bridge REP 1
Client ID: WEST
STORET ID
Coll. Date: 4/13/2009

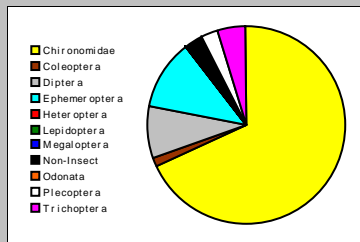
Abundance Measures

Sample Count: 307
Sample Abundance: 12,280.00 2.50% of sample used

Coll. Procedure: KICK
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	4	9	2.93%
Odonata			
Ephemeroptera	6	36	11.73%
Plecoptera	5	9	2.93%
Heteroptera			
Megaloptera			
Trichoptera	6	14	4.56%
Lepidoptera			
Coleoptera	1	5	1.63%
Diptera	5	26	8.47%
Chironomidae	6	208	67.75%

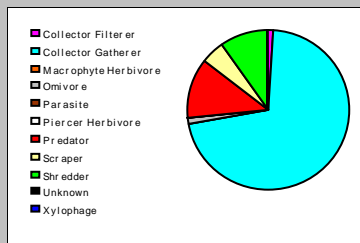


Dominant Taxa

Category	A	PRA
Micropsectra	115	37.46%
Eukiefferiella Gracei Gr.	42	13.68%
Orthocladus	25	8.14%
Ephemerella inermis	18	5.86%
Atherix	18	5.86%
Paqastia	17	5.54%
Drunella arandis	8	2.61%
Lepidostoma	6	1.95%
Psychodidae	5	1.63%
Optioservus	5	1.63%
Cinygmula	5	1.63%
Acari	4	1.30%
Pothastia Gaedii Gr.	3	0.98%
Polycelis coronata	3	0.98%
Brachycentrus americanus	3	0.98%

Functional Composition

Category	R	A	PRA
Predator	10	38	12.38%
Parasite			
Collector Gatherer	12	219	71.34%
Collector Filterer	1	3	0.98%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	4	14	4.56%
Shredder	5	30	9.77%
Omnivore	1	3	0.98%
Unknown			

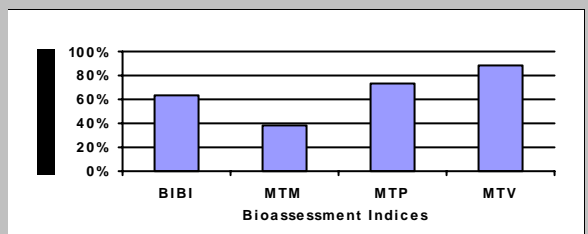


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	33	3	3		3
Non-Insect Percent	2.93%				
E Richness	6	3		3	
P Richness	5	3		3	
T Richness	6	3		3	
EPT Richness	17		3		2
EPT Percent	19.22%		1		0
Oligochaeta+Hirudinea Percent	0.65%				
Baetidae/Ephemeroptera	0.028				
Hydropsychidae/Trichoptera	0.071				
<i>Dominance</i>					
Dominant Taxon Percent	37.46%		2		1
Dominant Taxa (2) Percent	51.14%				
Dominant Taxa (3) Percent	59.28%	3			
Dominant Taxa (10) Percent	84.36%				
<i>Diversity</i>					
Shannon H (loge)	2.326				
Shannon H (log2)	3.356		3		
Margalef D	5.617				
Simpson D	0.186				
Evenness	0.068				
<i>Function</i>					
Predator Richness	10		3		
Predator Percent	12.38%	3			
Filterer Richness	1				
Filterer Percent	0.98%			3	
Collector Percent	72.31%		2		1
Scraper+Shredder Percent	14.33%		1		0
Scraper/Filterer	4.667				
Scraper/Scraper+Filterer	0.824				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	1.30%				
Swimmer Richness	1				
Swimmer Percent	0.33%				
Clinger Richness	12	3			
Clinger Percent	15.96%				
<i>Characteristics</i>					
Cold Stenotherm Richness	1				
Cold Stenotherm Percent	0.65%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	4				
Air Breather Percent	2.61%				
<i>Voltinism</i>					
Univoltine Richness	20				
Semivoltine Richness	4	3			
Multivoltine Percent	70.36%		1		
<i>Tolerance</i>					
Sediment Tolerant Richness	3				
Sediment Tolerant Percent	0.98%				
Sediment Sensitive Richness	2				
Sediment Sensitive Percent	0.98%				
Metals Tolerance Index	2.802				
Pollution Sensitive Richness	3	3			2
Pollution Tolerant Percent	7.49%	5			2
Hilsenhoff Biotic Index	4.283		3		1
Intolerant Percent	20.20%				
Supertolerant Percent	15.31%				
CTQa	50.621				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	32	64.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	22	73.33%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	16	88.89%	None
MTM	Montana DEQ Mountains (Bukantis 1998)	8	38.10%	Moderate



Metrics Report

Project ID: BWTF09GR
RAI No.: BWTF09GR008
Sta. Name: West Fork of the Gallatin River upstream of Big Sky Spur Rd. bridge REP 2
Client ID: WEST
STORET ID
Coll. Date: 4/13/2009

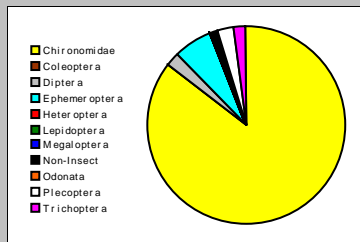
Abundance Measures

Sample Count: 341
Sample Abundance: 10,230.00 3.33% of sample used

Coll. Procedure: KICK
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	4	1.17%
Odonata			
Ephemeroptera	5	22	6.45%
Plecoptera	1	9	2.64%
Heteroptera			
Megaloptera			
Trichoptera	3	7	2.05%
Lepidoptera			
Coleoptera			
Diptera	2	7	2.05%
Chironomidae	8	292	85.63%

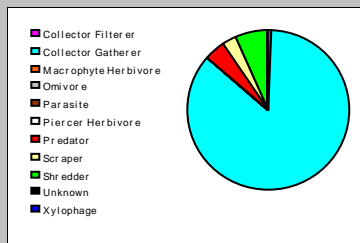


Dominant Taxa

Category	A	PRA
Micropsectra	129	37.83%
Orthocladius	90	26.39%
Eukiefferiella Gracei Gr.	45	13.20%
Tvetenia Bavarica Gr.	13	3.81%
Ephemerella inermis	11	3.23%
Podmosta	9	2.64%
Atherix	6	1.76%
Pagastia	5	1.47%
Cinyamula	5	1.47%
Hydrobaenus	4	1.17%
Pothastia Gaedii Gr.	3	0.88%
Brachycentrus americanus	3	0.88%
Acari	3	0.88%
Lepidostoma	2	0.59%
Cladotanytarsus	2	0.59%

Functional Composition

Category	R	A	PRA
Predator	5	14	4.11%
Parasite			
Collector Gatherer	9	292	85.63%
Collector Filterer	1	3	0.88%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	3	10	2.93%
Shredder	3	22	6.45%
Omnivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	21	3	2		1
Non-Insect Percent	1.17%				
E Richness	5	3		2	
P Richness	1	1		1	
T Richness	3	1		2	
EPT Richness	9		3		0
EPT Percent	11.14%		1		0
Oligochaeta+Hirudinea Percent	0.29%				
Baetidae/Ephemeroptera	0.091				
Hydropsychidae/Trichoptera	0.286				
<i>Dominance</i>					
Dominant Taxon Percent	37.83%		2		1
Dominant Taxa (2) Percent	64.22%				
Dominant Taxa (3) Percent	77.42%	1			
Dominant Taxa (10) Percent	92.96%				
<i>Diversity</i>					
Shannon H (loge)	1.897				
Shannon H (log2)	2.737		2		
Margalef D	3.433				
Simpson D	0.235				
Evenness	0.094				
<i>Function</i>					
Predator Richness	5		2		
Predator Percent	4.11%	1			
Filterer Richness	1				
Filterer Percent	0.88%			3	
Collector Percent	86.51%		1		0
Scraper+Shredder Percent	9.38%		1		0
Scraper/Filterer	3.333				
Scraper/Scraper+Filterer	0.769				
<i>Habit</i>					
Burrower Richness	1				
Burrower Percent	0.29%				
Swimmer Richness	1				
Swimmer Percent	0.59%				
Clinger Richness	6	1			
Clinger Percent	7.33%				
<i>Characteristics</i>					
Cold Stenotherm Richness	1				
Cold Stenotherm Percent	0.29%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	1				
Air Breather Percent	0.29%				
<i>Voltinism</i>					
Univoltine Richness	9				
Semivoltine Richness	2	1			
Multivoltine Percent	87.10%		0		
<i>Tolerance</i>					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	0.29%				
Sediment Sensitive Richness	1				
Sediment Sensitive Percent	0.59%				
Metals Tolerance Index	2.775				
Pollution Sensitive Richness	3	3		2	
Pollution Tolerant Percent	2.35%	5		3	
Hilsenhoff Biotic Index	4.938		3		1
Intolerant Percent	9.97%				
Supertolerant Percent	14.66%				
CTQa	66.368				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	20	40.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	17	56.67%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	13	72.22%	Slight
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe

