RESULTS OF THE AQUATIC MONITORING PROGRAM IN STREAMS AT THE ROCKY FLATS SITE, GOLDEN, COLORADO 2001-2002

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Prepared for:

U. S. Department of Energy
Rocky Flats Field Office
Golden, Colorado

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EXECUTIVE SUMMMARY

An aquatic monitoring program in streams draining the Rocky Flats Environmental Technology Site was initiated in the summer 2001 to characterize the existing aquatic communities (fish and macroinvertebrates) and physical habitat conditions in the Walnut, Woman, and Rock Creek drainages. The purpose of this program is to provide a baseline for monitoring the potential influences of site closure activities, which will be ongoing through 2006, and may also be used as a reference for the post-closure period. Monitoring results for the 2001-2002 period are presented in this report, with comparisons to previous studies at Rocky Flats, upper Big Dry Creek, and other relevant published literature.

All of the streams at Rocky Flats are flow limited. While perennial flows are typically in the upper reaches of all three drainages, flows diminish considerably in downstream reaches where the streams become largely intermittent. Flow regimes, however, are different in the Walnut Creek drainage in areas downstream from South Walnut Creek. Between Ponds B-3 and B-5, the stream is effluent-dominated and discharges are relatively stable, whereas flows are discharge-dependent in reaches downstream from the terminal ponds (Pond A-4 on North Walnut Creek and Pond B-5 on South Walnut Creek) with releases occurring at 4 to 6-week intervals for durations of 10-15 days. When pond discharges are not occurring, the stream channel is typically dry, except when precipitation events are sufficient to provide adequate flow. In Woman Creek, in areas downstream from Pond C-2, pond releases can also occur, but happen on a considerably less frequent basis. Such natural and anthropogenic hydrologic regimes significantly influence habitat quality for aquatic life. In the upper reaches of Walnut, Woman, and Rock Creeks where flows are perennial, habitat assessment scores were generally highest indicating overall better habitat quality. Aside from the obvious flow limitations in all drainages, in the effluent-dominated reach of South Walnut Creek and the discharge-dependent lower section of Walnut Creek, bank erosion which results in poor bank stability and sediment inputs to the stream is the main problem that negatively affects physical habitat and aquatic life. Stream bank erosion is further aggravated by the periodic discharges from the terminal ponds.

Fish abundance and distribution in these streams is severely limited due to the obvious lack of permanent water. Fish were only collected at seven of the study sites, and only three species were collected. A naturally self-sustaining population of fathead minnows was found at site WC3 in South Walnut Creek between Ponds B-4 and B-5, and at site RC2 in Rock Creek below Lindsey Pond. A stable and healthy creek chub population was found at the upper two sites in Woman Creek (WO1 and WO2). A single specimen of longnose dace was also collected at site WO1. Otherwise, only one or two specimens of

fathead minnows were collected at the downstream sites in Walnut Creek (WC4 and WC5) and the lowest site in Rock Creek (RC3). These fish had likely washed into these locations from upstream areas during periods of increased discharges. While the intermittent nature of these streams obviously precludes the establishment of viable fish populations, macroinvertebrate populations were not as affected due to their ability to recolonize newly inundated habitats and their comparatively shorter life cycles.

The macroinvertebrate community was rich and diverse, and comprised mainly of hardy and tolerant species. The dominant organisms were similar in each drainage, with dipterans most abundant in Walnut and Rock Creeks, and oligochaetes most abundant in Woman Creek. The dipterans were mainly midge larvae (Chironomidae), while tubificid worms were the dominant oligochaetes. Ephemeroptera (mayflies) were relatively abundant throughout the drainages, and included moderate to tolerant taxa. Trichoptera (caddisflies) were generally present but in low numbers except at the effluent-dominated site in Walnut Creek (WC3). Interestingly, a relatively large plecopteran (stoneflies) population was found at one site in Rock Creek (RC3). Stoneflies were also collected in Woman Creek, but in considerably fewer numbers. HBI and ICI results further indicate the macroinvertebrate community was largely comprised of tolerant organisms. Comparisons with earlier studies of Rocky Flats streams and with the more recent studies of lower Walnut Creek and upper Big Dry Creek showed that community structure and abundance were somewhat similar to that found in Walnut, Woman, and Rock Creeks during the 2001-2002 study period.

1.0 INTRODUCTION

An aquatic monitoring program was initiated in the summer 2001 at the Rocky Flats Environmental Technology Site (Rocky Flats) in Golden, Colorado, and was conducted for the Department of Energy (DOE) Rocky Flats Field Office. The purpose of this program is to establish a data base to characterize the existing aquatic communities and habitat conditions in the stream environments of Walnut, Woman, and Rock Creeks in the Buffer Zone surrounding the Industrial Area at the Site. Baseline surveys were conducted to document the abundance and distribution of fish and benthic macroinvertebrate populations and physical habitat parameters at selected sampling locations. Monitoring results for the 2001-2002 period are presented in this report. These results and additional data collected in subsequent years will establish a data base that can be used to monitor the potential impacts of ongoing closure activities through 2006 to drainages on the Site and in downstream areas, as well as provide a baseline for comparison with post-closure years. After closure, the Site will be turned over to the U.S. Fish and Wildlife Service and will be called the Rocky Flats National Wildlife Refuge.

Planned site closure activities such as cessation of wastewater treatment plant operations by September 2004, removal of ponds in the Walnut and Woman Creek drainages, removal of buildings and impervious surfaces, and re-grading of remediated areas will undoubtedly affect the existing hydrologic regimes and water quality conditions, which may potentially influence aquatic environments and the aquatic communities inhabiting these areas. Upon closure of the wastewater treatment plant, periodic discharges from terminal ponds (Ponds A-4 and B-5) will be reduced resulting in significantly diminished flows in Walnut Creek, which will undoubtedly influence the aquatic environment.

Monitoring results will be compared with any relevant previous studies at the Site. Results will also be compared with the ongoing monitoring program on Big Dry Creek conducted since 1997 for the Cities of Broomfield, Northglenn, and Westminster, Colorado. DOE has provided significant funding for the Big Dry Creek project since 2000, which has allowed for the improvement and continuation of the program. Comparisons of Rocky Flats monitoring results with the ongoing studies on Big Dry Creek and Lower Walnut Creek will determine if any impacts have occurred in downstream areas as a result of closure activities.

The project study area includes the headwater reaches of Walnut, Woman, and Rock Creeks in the Buffer Zone. Both Walnut and Woman Creeks flow in an easterly direction extending to the eastern Site boundary at Indiana Street, while Rock Creek flows towards the northeast and leaves the Site at the northern boundary at State Highway 128. The project study area and locations of the 13 study sites are depicted in Figure 1. Five sites are located on Walnut Creek, with four sites on both Woman and Rock Creeks. Study site locations and existing flow characteristics are presented in Table 1. Sampling occasions and the types of samples collected at each site are presented in Table 2 for the 2001-2002 monitoring period.

Andrew

WWE
DRAFT MEMORANDUM

To: Big Dry Creek Watershed Association Steering Committee

From: Wright Water Engineers, Inc.
Jane Clary and Dave Mehan

Date: April 8, 2003

Re: Supplemental Biological and Selected Water Quality Data Exploration 1997-2001

INTRODUCTION

In 1999, Wright Water Engineers, Inc. (WWE) completed an evaluation of chemical, physical and biological data collected from Big Dry Creek during 1997-1998. The findings of this evaluation were provided in "Integrated Analysis of Habitat, Macroinvertebrate, Fish, Flow and Selected Water Quality Parameters on the Main Stem of Big Dry Creek" (WWE 1999). The purpose of this initial assessment was to develop an understanding of the factors influencing aquatic life in the creek and to determine whether a more stringent unionized ammonia standard was necessary to protect the Johnny darter. The report also provided recommendations for improvements to the monitoring program.

During late 2002, the Big Dry Creek Watershed Association Steering Committee determined that an update to the WWE (1999) report would be appropriate since five years of biological data were now available for the creek. As a result, this technical memorandum provides a supplemental evaluation to the WWE (1999) report. This memorandum compares the findings from the five-year data set to the WWE (1999) report and further explores possible trends with regard to the biological data. Key relationships explored in this memorandum include:

1) Trends over time

2) Findings related to the artificial substrate sampling

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3) Effects of flow on macroinvertebrate and fish indices

4) Relationship between new selenium data and macroinvertebrate and fish communities.

Reader familiarity with the previous WWE (1999) report is assumed, as well as familiarity with the various Aquatics Associates reports that summarize the biological results (Aquatics Associates 1998, 1999a, 1999b, 2002). Figure 1 provides a map of the sampling locations included in this report. The approach, findings, discussion, conclusions and recomendations for this technical memorandum follow.

APPROACH

Consistent with the general approach used in the WWE (1999) report, potential relationships between fish and macroinvertebrate community health indices, habitat and selected water quality and flow parameters were explored. The biological sample sets included in this review are summarized in Table 1. In addition to the biological data, water quality and flow data sets were retrieved from the Big Dry Creek water quality database for the three-month period prior to and/or including the sampling event. For the spring samples, January through March data were retrieved. For the fall samples, August through October data were retrieved. The average values of the water quality parameter or flow for each time period were then calculated for purposes of data exploration. The "raw data" used in this analysis are included in Attachment 1 of this report.

Table 1
Sample Sets Collected on Big Dry Creek

Sample Type	1997	1998	1999	2000	2001
Macroinvertebrates					
Kick	Spring/Fall	Spring/Fall	Spring	Spring/Fall	Spring/Fall
Hess	Spring/Fall	Spring/Fall	Spring	Spring	--
Artificial Substrate	--	--	--	Fall	Fall
Fish	Spring/Fall	Fall	Fall	Fall	Fall
Habitat	Spring	--	--	Fall	Fall

Brief explanations of several terms used throughout this technical memorandum include:

- Sample Collection Techniques: With regard to benthic macroinvertebrates, three sample collection methods have been used at various times during the last five years:

  - "Kick" samples were collected by using a hand-held kick net with a mesh size of 425 microns to collect samples from representative habitat types including pool, riffle, run and bank areas.

  - "Replicate" or "Hess" samples were collected in shallow riffle areas only using a modified Hess sampler, equipped with 250 micron Nitex mesh, which samples a standard unit area, allowing for determination of macroinvertebrate densities (Aquatics Associates 1998).

  - Artificial substrate samples were collected using Hester-Dendy samplers at the reference site bdc1.5 and four sites downstream of the wastewater treatment plants. Three Hester-Dendy samplers were installed at each location for a four-week colonization period, and samplers were retrieved concurrent with the kick net sampling event each fall (Aquatics Associates 2002).

- Habitat Scores: Overall habitat scores for each monitoring location were developed following EPA protocols by WWE (WWE 1999) for the 1997 data set and by Aquatics Associates (2002) for the 2000/2001 data sets. Nine standard parameters were used to develop an overall habitat score at each monitoring location. These parameters address characteristics in three categories including: substrate and instream cover, channel morphology, and riparian and bank structure. These parameters are weighted to emphasize the most biologically significant parameters. Each parameter is rated poor, fair, good or excellent and assigned a numeric value. These scores are then totaled and compared to a reference site to develop a final habitat ranking. A reference site is used to normalize the assessment to the "best attainable" situation. Habitat scores increase as habitat quality increases.

One issue with regard to the habitat scores used in this analysis is that the habitat rating procedure and size of the scores changed between 1997 and 2000/2001. The 1997 ratings were based on the EPA (1989) method which has a maximum score of 135, while the 2000/2001 ratings were based on the EPA (1998) method which has a maximum rating of 200. Therefore, a proportional constant of 1.48 (i.e., 200/135=1.48) was applied to the 1997 ratings so that the 1997 and 2000/2001 scores could be examined as one data set.

- Invertebrate Community Index (ICI): Just as overall habitat scores are developed based on scoring several individual parameters then relating these to a reference site for development of an overall habitat score, an overall measure of benthic macroinvertebrate community health is the "Invertebrate Community Index" (ICI). Following EPA's Rapid Bioassessment Protocol III, individual parameters (metrics) used to calculate the ICI for a monitoring location include taxa richness, modified Hilsenhoff biotic index, ratio of scrapers to filtering collectors, ratio of EPT (Ephemeroptera, Plecoptera, Trichoptera) and Chironomidae abundance, percent contribution of dominant taxon, community similarity index and ratio of shredder functional feeding group to total number of individuals collected. (See EPA [1998] for more information on these metrics.) For purposes of the data analysis that follows, the ICI is used to represent benthic community health. Individual metrics are not included in the discussion in order to limit the scope of data analysis, consistent with the WWE (1999) approach. The Aquatics Associates (1998, 1999a, 1999b, 2002) reports should be referenced for more information on the individual metrics.

- Index of Biotic Integrity (IBI) for Fish: The IBI serves as an integrated analysis of fish metrics associated with EPA's Rapid Bioassessment Protocol V (EPA 1989). The IBI is calculated by using 13 metrics that measure characteristics such as species richness and composition, trophic composition, and fish composition and condition. The overall IBI is assigned based on comparison to a reference site. EPA (1989) should be referenced for

more detail on individual metrics. The IBI is an adaptable index, allowing the choice of metrics and scoring criteria on a regional basis.

Correlation analyses were used as a screening tool to identify potential statistically significant relationships among selected variables. The correlation coefficient ("r") value indicating a statistically significant relationship varies with the sample size (Mendenhall and Ott 1976). For most of the correlation analyses, a sample size greater than 30 existed, so $r \geq 0.34$ indicated a statistically significant relationship at the 95 percent level of confidence. For smaller sample sizes, larger r values are required to be statistically significant. For example, for habitat scores ($n = 23$), $r = 0.41$ and for artificial substrate samples ($n = 10$), $r = 0.63$. A negative value for r indicates an inverse relationship between variables.

Correlation analyses were performed for the following parameters:

- Unionized ammonia, iron, total suspended solids (TSS), dissolved selenium
- Flow
- Habitat Scores
- Macroinvertebrate Invertebrate Community Index (ICI) scores for Hess, kick and artificial substrate samples
- Fish Index of Biotic Integrity (IBI) scores
- Location (general upstream to downstream trends)
- Season (for kick samples only)

With regard to the seasonal evaluation, only kick net macroinvertebrate samples were evaluated for seasonal trends because they had four data sets in the fall and five data sets for the spring, making a seasonal evaluation possible. By contrast, the majority of the fish data were collected in the fall (five out of six sets), and both of the artificial substrate data sets were collected in the

fall, making seasonal evaluation less meaningful. Twice as many Hess samples were collected in the spring (four out of six) as the fall, so seasonal evaluations were not pursued for the Hess samples.

Following correlation analysis, scatter plots of the data were developed to further explore relationships among variables. Using Excel, linear regression analyses were then performed for each of the scatter plots. In several cases, log-normal plots were also explored, but because they did not significantly improve the statistical relationships, they are not included in this technical memorandum. Because of the limited scope of this memorandum, WWE did not delve into more complicated statistical approaches such as multiple regression analysis, although these analyses could be performed in the future.

FINDINGS

Figure 2 plots trends over time for the ICI kick, ICI Hess, ICI artificial substrate and IBI fish scores. Implications of these plots are provided in the discussion section of this memorandum.

Table 2 contains a matrix showing linear correlation coefficients (r values) between the sets of independent and dependent variables analyzed. The values of r that are considered to be statistically significant based on the various sample sizes are highlighted in yellow. A bulleted text summary of the table follows, along with identification of figures that provide scatter plots and the linear regression analysis. A discussion of these findings is provided in the next section of this memorandum. In reviewing the correlation coefficients below, it is important to remember that correlation does not necessarily imply cause. For example, it is unlikely that fish community health is improved by higher selenium concentrations, even though the r value for this relationship is statistically significant.

Table 2

Correlations Between Selected Independent and Dependent Variables on Big Dry Creek

	Un-ionized Ammonia	Flow	Iron	Se, Dissolved	TSS	Habitat (adj)	Year	Season	Location	ICI Kick	ICI Hess	ICI Art. Substrate	IBI Fish
Un-ionized Ammonia	1.00												
Flow	0.26	1.00											
Iron	0.73	0.41	1.00										
Se, Diss	-0.21	-0.20	-0.13	1.00									
TSS	0.56	0.64	0.78	-0.23	1.00								
Habitat (adj)	-0.66	-0.47	-0.40	0.43	-0.69	1.00							
Year	-0.17	-0.22	-0.17	-0.37	-0.08	0.58	1.00						
Season	0.25	-0.30	0.17	-0.09	0.11	-0.61	0.00	1.00					
Location	0.36	0.64	0.36	-0.09	0.64	-0.66	-0.03	0.00	1.00				
ICI Kick	-0.23	-0.14	-0.20	0.30	-0.32	0.50	-0.32	-0.50	-0.51	1.00			
ICI Hess	-0.28	-0.13	-0.10	0.62	-0.12	0.92	-0.37	-0.58	-0.45	0.86	1.00		
ICI Art. Substrate	-0.19	-0.68	-0.57	0.60	-0.77	0.71	-0.42	NA	-0.85	0.65	NA	1.00	
IBI Fish	-0.02	-0.36	-0.32	0.45	-0.33	0.13	0.09	0.06	-0.26	0.32	0.37	-0.01	1.00
Sample Size	69	66	70	35	63	23	74	74	74	61	40	10	44

Table Note: Highlight indicates statistically significant correlation based on values calculated for various sample sizes (Mendenhall and Ott 1976). Note that statistically significant "r" values vary based on sample size, so what appears to be a relatively low r value such as 0.34 may be statistically significant for large sample sizes, but not statistically significant for smaller sample sizes.

To summarize the table above and as confirmed in the scatter plots, statistically significant relationships based on correlation analysis included the following:

- ICI Kick:
  - Positively correlated with habitat, ICI Hess and ICI artificial substrate.
  - Inversely correlated with location. (Higher at upstream locations.)
  - Seasonal variation indicated lower scores in the spring.
- ICI Hess:
  - Positively correlated with ICI kick, and habitat.
  - Inversely correlated with location. (Higher at upstream locations.)

- ICI Artificial Substrate:
  - Positively correlated with ICI kick and habitat.
  - Inversely correlated with flow and TSS.
  - Inversely correlated with location. (Higher at upstream locations.)
- IBI Fish:
  - Inversely correlated with flow.
  - Positively correlated with selenium.
- Habitat (Figures 3a-3d):
  - Positively correlated with ICI Hess, ICI kick and ICI artificial substrate.
  - Inversely correlated with TSS, flow, unionized ammonia.
  - Inversely correlated with location. (Higher at upstream locations.)
- Unionized Ammonia (Figures 4a-4d):
  - No statistically significant correlation with ICI/IBI scores.
  - Positively correlated with iron and TSS.
  - Inversely correlated with habitat.
  - Positively correlated with location, increasing in a downstream direction.
- TSS (Figures 5a-5d):
  - Inversely correlated with ICI artificial substrate and habitat.
  - Positively correlated with flow, iron and unionized ammonia.
  - Positively correlated with location, increasing in a downstream direction.
- Flow (Figures 6a-6d)
  - Inversely correlated with artificial substrate ICI, fish and habitat
  - Positively correlated with TSS and iron
  - Positively correlated with location, increasing in a downstream direction.
- Iron (Figure 7a-7d):
  - Positively correlated with TSS, unionized ammonia and flow.
  - No statistically significant correlation with ICI/IBI scores.
  - Positively correlated with location, increasing in a downstream direction.

- Selenium:
  - Positively correlated with fish IBI scores.
  - Not significantly correlated to location.
- Location:
  - ICI scores are inversely correlated with location, with upstream locations have higher scores for kick, Hess and artificial substrate samples.
  - IBI scores are not statistically significantly correlated with location.
  - Positively correlated with unionized ammonia, flow, iron and TSS (all increase in a downstream direction).

Discussion

The discussion below addresses 1) trends over time, 2) factors influencing the biologic community, and 3) comparison of the five-year data set to the WWE (1999) findings.

Trends Over Time

Trends over time for the overall biological community are unclear. Specifically, as shown in Figure 2, the macroinvertebrate community, as measured by the kick ICI scores, appeared to decrease in overall health over the five-year period. In contrast, the fish community health, as indicated by IBI scores, improved between 1997 and 2000, but declined in 2001. Biological community health decreases in 2001 could potentially be explained by the severe drought affecting Colorado. However, correlations between fish IBI and benthic ICI scores are inversely related to flow (i.e., community scores generally increase at lower flows). Intuitively, however, it would be reasonable to expect some influence of the drought on the aquatic community. Biological data for 2002 will be useful in further evaluating the possible influence of drought, and trends with the biological communities in the creek.

Statistically significant trends over time for TSS, unionized ammonia, iron, and flow were not present based on the data set included in this analysis. Only two full years of selenium data were available; therefore, trends over time for selenium are not considered to be meaningful.

Factors Influencing the Biological Community

Factors influencing the biological community are discussed according to sample types: kick, Hess and artificial substrate for macroinvertebrates and fish. This is followed by additional discussion on habitat and flow.

Kick Samples

The macroinvertebrate kick ICI scores (n = 61) are statistically significantly correlated with habitat (r = 0.50), but not the selected water quality or flow variables. The kick ICI scores were more strongly correlated with the 1997 habitat scores (r = 0.86) than the 2000/2001 habitat scores. (This is after adjusting the 1997 scores by a factor of 1.48.) The kick ICI scores also showed a statistically significant inverse relationship with location (r = -0.51), with upstream locations having higher scores.

Kick scores were also correlated with season, with the spring samples having lower ICI scores. When examining the spring and fall ICI scores separately, habitat continues to be the dominant factor impacting each season (r = 0.86, r = 0.50). In the spring, flow (r = -0.45) and TSS (r = -0.36) also showed statistically significant inverse correlations with the kick scores. During the spring, selenium (r = 0.64) also showed a positive correlation to the ICI scores, although this relationship is counterintuitive. More specifically, it is unlikely that higher selenium concentrations improve macroinvertebrate health. Location was also important in both the spring and the fall, with upstream sites generally showing higher scores.

Positive correlations between selenium and the kick ICI scores (and the fish IBI scores discussed below) may be explained by the covariation between habitat scores and selenium (r = 0.43). Locations with better habitat typically have higher selenium concentrations than locations with poorer habitat. While it is unlikely that higher selenium concentrations are improving fish and benthic communities, these data suggest that selenium concentrations are at least not having an adverse impact on aquatic life.

Hess Samples

The Hess samples (n = 40) were collected from the spring of 1997 through the spring of 2000. These samples were strongly correlated with habitat (r = 0.92). The Hess samples showed the strongest relationship to habitat of all of the biologic community samples. This makes sense because the Hess samples are collected from riffles, the quality of which are well reflected in the habitat score while kick samples are collected from all habitat types present. The Hess samples showed inverse correlations with location, with the upstream-most sites having higher ICI scores, indicating a healthier macroinvertebrate community. Hess scores were also correlated with season, with the spring samples having lower ICI scores, as was the case for the kick samples; however, seasonal variation was not further explored since the kick ICI scores have a larger sample size with more even distribution between the spring and fall.

Artificial Substrate Samples

In keeping with the recommendation of the WWE (1999) report, Hester Dendy artificial substrate samplers were installed at five sites along the creek in 2000 and were sampled in the fall of 2000 and spring of 2001. These samplers greatly reduce or eliminate the confounding effects of substrate on the macroinvertebrate community. Since substrate type becomes a constant, differences noted in the community at various locations must be due to water quality or possibly flow. Table 2 indicates that ICI values from the Hester Dendy samplers were significantly inversely related to flow and TSS, which tended to increase in a downstream direction, as shown in Figure 8. In other words, locations with higher flow and TSS concentrations had poorer macroinvertebrate communities. Locations with higher flow and TSS concentrations increase in a downstream direction.

Additionally, the positive correlation between the artificial substrate and the ICI kick scores suggests that there are factors affecting the benthic community that are not habitat related. However, the artificial substrate and kick samples do not have a common statistically-significant independent variable based on the correlations. For example, the artificial substrate samples are

most strongly correlated with TSS (r = -0.77), but the kick samples do not show a statistically significant correlation with TSS (r = -0.32, with r = -0.34 necessary to be statistically significant for this sample size).

Another interesting aspect of the correlations is that the artificial substrate scores were fairly strongly correlated with habitat (r = 0.71); this is counterintuitive since the artificial substrate samples should reduce the influence of habitat. This is likely due to the fact that both habitat and water quality decrease in a downstream direction. It may also be due to other aspects of the habitat score reflected in this correlation that are not substrate-based. For example, the habitat scores include metrics such as flow/velocity, pool/riffle and run/bend ratios, bank vegetation and streamside cover; the influence of these metrics is not completely removed by artificial substrate samplers. It should be noted, however, that most of the metrics in the overall habitat scores are effectively removed by the artificial substrate samplers (e.g., bottom substrate, embeddedness, channel alteration, bottom scouring, bank stability, etc.).

Fish Samples

The fish IBI scores (n = 44) were statistically significantly inversely correlated with flow (r = -0.36) and positively correlated with selenium (r = 0.45). More specifically, fish IBI scores were higher at locations with lower flows. Flow is correlated with stream location (r = 0.64), with upstream sites having lower flows. Flow is also correlated with habitat (r = -0.47), with higher habitat scores at locations with lower flows. (See the kick ICI discussion for an explanation of the selenium-IBI relationship.)

Although a seasonal evaluation of the fish data has limited value because only one spring fish sampling event was conducted out of six sampling events, the spring sample was positively correlated with flow (r = 0.70). This is interesting because the annual and fall samples show inverse correlations to flow, which is counterintuitive. One possible explanation is that spring flows in the creek may be of better quality than the flows in the fall.

Habitat Scores

The 1997 habitat scores are much more strongly correlated to the both the fish IBI and benthic ICI scores than are the 2000/2001 habitat scores (even after adjusting the scores to account for method changes). Overall, habitat scores show an inverse correlation with location ($r = -0.66$), with upstream locations showing higher habitat scores. This would be expected in Big Dry Creek as it transitions from a foothills to a plains stream with an associated increase in sediment load, reduction in quality of riffles and habitat diversity, etc.

Flow

In general, for a relatively small and possibly flow-limited creek like Big Dry Creek, higher values of IBI and ICI scores would be expected with more flow. As shown in Table 2 and on Figures 5a-5d, ICI and IBI values were inversely correlated with flow. Further analysis indicates that other parameters including TSS, iron and ammonia, which could affect aquatic life, are directly related to flow and this could explain why ICI and IBI values were inversely related to flow. More specifically, concentrations of these parameters are higher at higher flows, adversely affecting the macroinvertebrate and fish communities. The effect of flow and associated parameters on the health of aquatic communities is greatest downstream on the creek where these concentrations are generally higher.

Comparison of Five Year Data Set to the WWE (1999) Evaluation

Analysis of the expanded database generally confirms the major findings of the WWE (1999) report, although some relationships that appeared relatively strong in the 1999 evaluation weakened in the larger data set. A comparison of the 1999 conclusions to the five-year data set includes these findings:

- The nature of the aquatic communities in the creek is affected by more than one factor, and the factors change in magnitude and importance along the creek.

- Macroinvertebrate results are similar for Hess and kick samples. The strong correlation (r = 0.86) between their ICI scores supports the Watershed Association's decision to limit sampling efforts to one protocol (kick) to be more cost-effective with the sampling program.

- Seasonal variation for the kick samples continued to occur, with lower scores in the spring.

- As was the case in the WWE (1999) report, the macroinvertebrate ICI scores were directly related to habitat quality. This is shown on Figure 3a-d where the strongest relationship occurs with ICI values from Hess samples Fish scores were less strongly related to habitat than macroinvertebrates in both the WWE (1999) report and the five-year data set, although the relationship was stronger in WWE (1999) than the five-year data set.

- In the WWE (1999) report, considerable attention was given to the Johnny darter, whose occurrence was not significantly correlated to unionized ammonia concentrations. Since ammonia concentrations have continued to be low (i.e., below the stream standard of 0.1 mg/L) since 1998 and show no significant relationship to fish or macroinvertebrates, the Johnny darter was not focused on in this technical memorandum.

- In the WWE (1999) report, benthic ICI's were inversely correlated to several water quality parameters analyzed which included lead, unionized ammonia, iron and TSS. Benthic ICIs typically showed stronger and more consistent correlations to water quality parameters than the fish IBI's. In the five-year data set, only the artificial substrate samples showed a statistically significant correlation to any of the water quality parameters, and in that case, only TSS (see Figure 6d). (Note: Lead was not explored in this technical memorandum because it has been consistently below stream standards since 1995. Although unionized ammonia has also been below its stream standard, it was retained in this analysis due to the Colorado Division of Wildlife's concern regarding potential aquatic life impacts. Iron was included in this analysis because is has periodically exceeded its stream standard of 1 mg/L, which is in place for protection of aquatic life.)

- The effect of flow on macroinvertebrate and fish communities was not clear in the 1999 study, where correlations with flow and ICI and IBI values were weak. As discussed above, flow was more strongly related to the quality of the macroinvertebrate and fish communities for the five-year data set.

- The covariation between TSS, iron, unionized ammonia, flow and habitat observed in WWE (1999) continued to exist in the five-year data set. In general, these water quality constituents had higher concentrations at locations with lower habitat scores and higher flows. One difference between the five year data set and the WWE (1999) data set is that with the exception of TSS and the artificial substrate samples, these water quality constituents were not significantly correlated with macroinvertebrate and fish community scores.

Conclusions

1. No single variable explains trends in ICI/IBI scores on Big Dry Creek.

2. Upstream locations generally have higher quality fish and benthic communities than downstream locations. Upstream locations also generally have higher habitat scores, better water quality and lower flows.

3. Habitat appears to be the most consistent influence on benthic ICI scores.

4. Fish IBI scores are not strongly related to the variables explored.

5. Seasonal variation was evident for the kick ICI scores, with spring samples showing lower scores.

6. Unionized ammonia does not appear to be affecting the fish and benthic communities, based on concentrations present in the creek during the spring and fall of the last five years. Unionized ammonia concentrations on the creek are generally below the stream standard.

7. Iron does not appear to be affecting the fish and benthic communities, even though iron periodically exceeds the stream standard.

8. Dissolved selenium not appear to be adversely affecting the fish and benthic communities, based on the limited sample size reviewed.

9. Artificial substrate samples showed stronger relationships to flow, TSS and location than did the other benthic samples, indicating that factors other than habitat appear to be influencing the aquatic community. In other words, habitat alone does not fully explain benthic community health.

Recommendations

1. Continue the current biological monitoring program including these aquatic parameters: a) the benthic community through kick samples in the spring and fall; b) artificial substrate samples in the fall; c) the fish community in the fall; and d) habitat. These recommendations are made in the context of the evolving regulations and guidance of the Colorado Water Quality Control Division related to assessment of aquatic communities and the potential relevance of these aquatic life data with regard to Big Dry Creek's relationship to the 303(d) list.

2. Utilize the information collected over the last five years in combination with data available for comparable streams on the Front Range to develop "expected conditions" for upper and lower Big Dry Creek. The "expected condition" forms the basis for an assessment of whether or not the aquatic community is impaired. The reference sites used in the Aquatics Associates reports are a key component in developing expected conditions, but these data need to be compared to other data sources for similar streams along the Front Range.

3. Once expected conditions are developed, consider developing thresholds of impairment for the aquatic community. In other words, what percent change (e.g., 25%, 50%) in the expected condition indicates impairment for the Big Dry Creek aquatic life community?

4. Continue to actively participate in and monitor progress and changes related to Colorado's 303(d) listing methodology to ensure that Big Dry Creek's monitoring program is consistent

with regulatory expectations of the CWQCC and EPA. In particular, the Watershed Association should be familiar with these references:

a. CWQCD's "Proposed Aquatic Life Classification System and Potential Regulatory Implications," March 10, 2003 draft.

b. EPA's Consolidated Listing Methodology (CALM) guidance, see http://www.epa.gov/owow/monitoring/calm.html.

c. EPA's 2002 Integrated Water Quality Assessment Report guidance, see http://www.epa.gov/owow/tmdl/2002wqma.html.

d. EPA's 2002 March Clarification, see http://www.epa.gov/owow/tmdl/guidance/biochange20302.pdf

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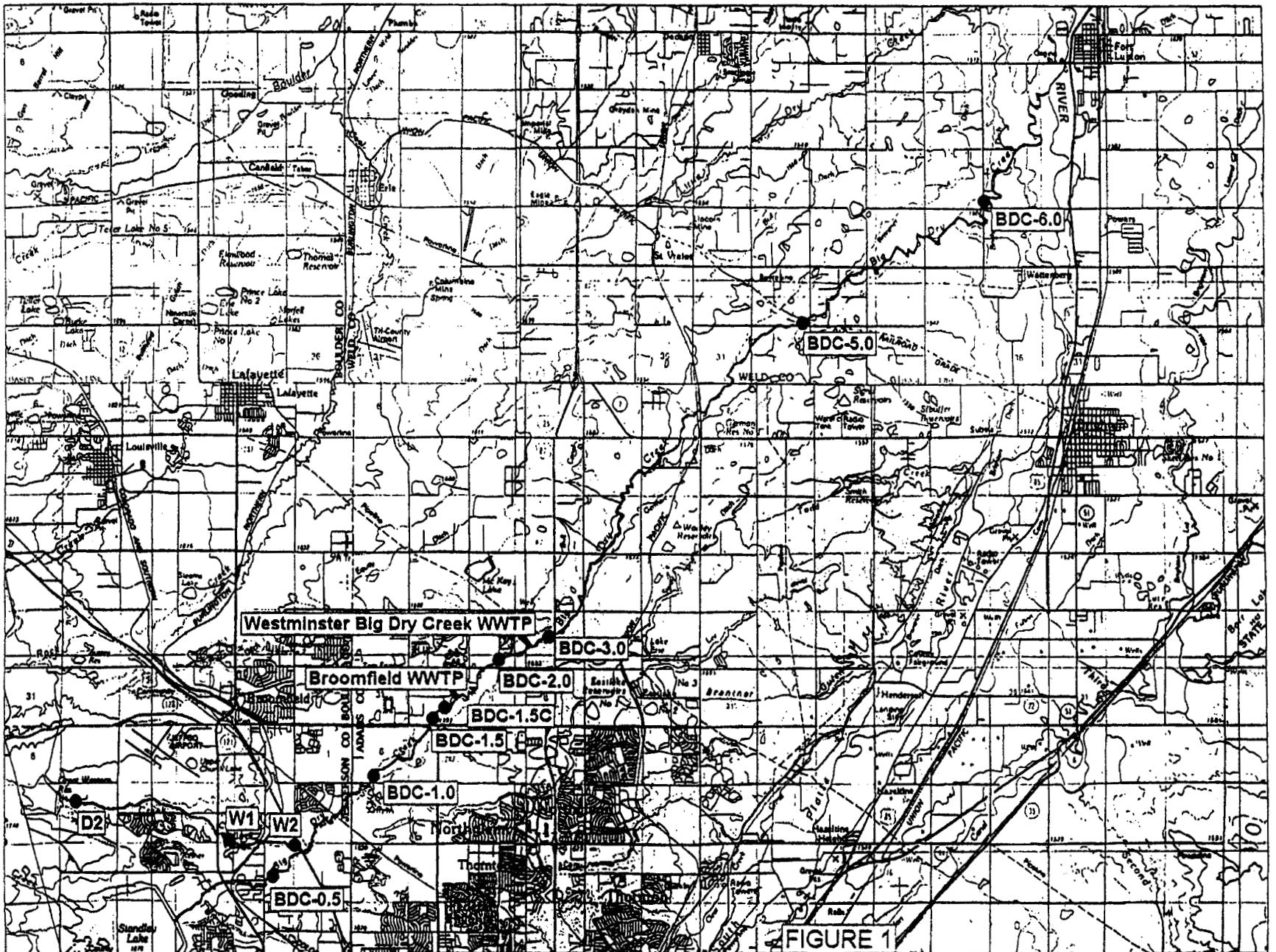


FIGURE 1

BIOLOGICAL MONITORING SITES IN BIG DRY CREEK AND WALNUT CREEK

Aquatics Associates, Inc.

Figure 2
Big Dry Creek Biological Trends Over Time

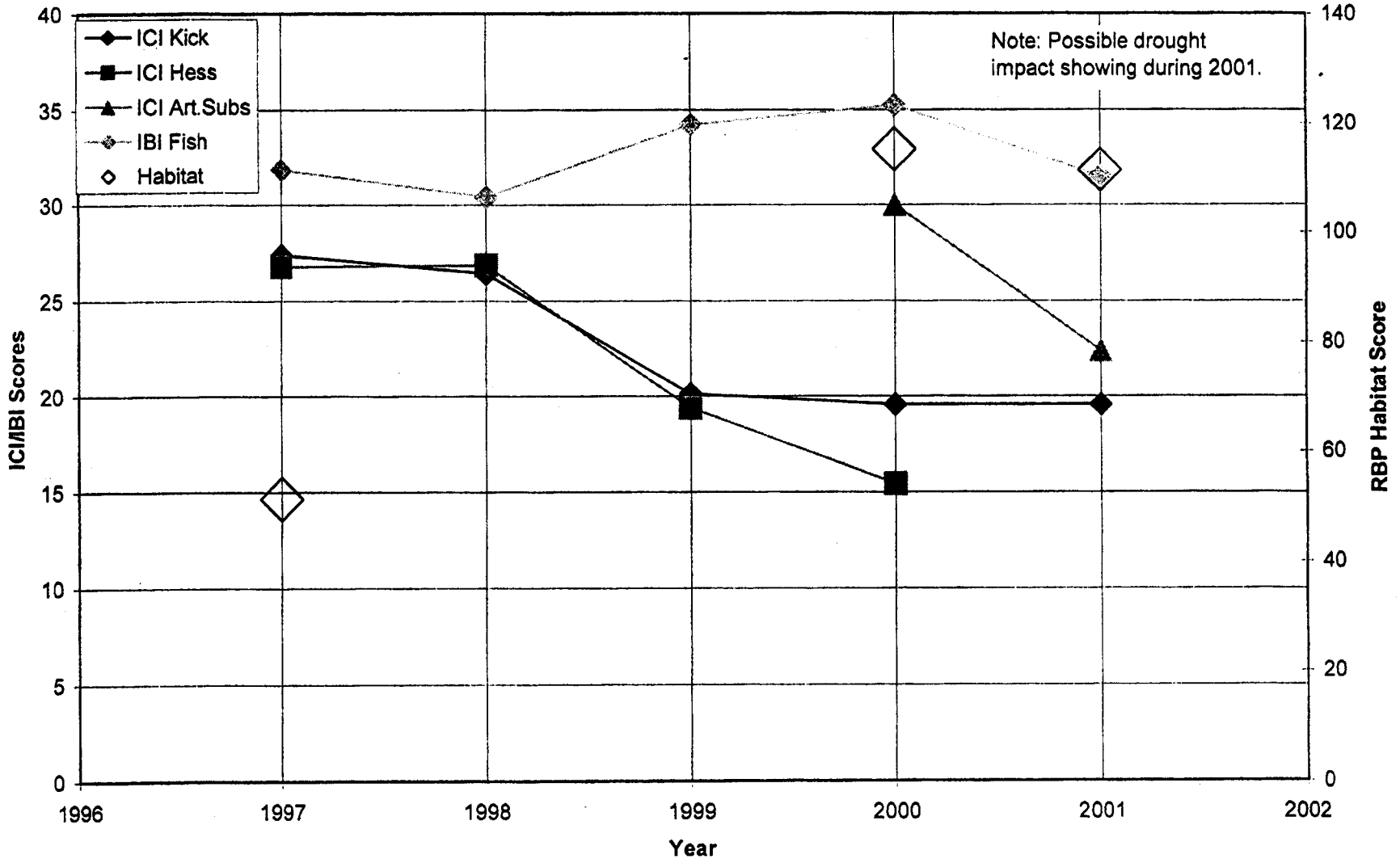
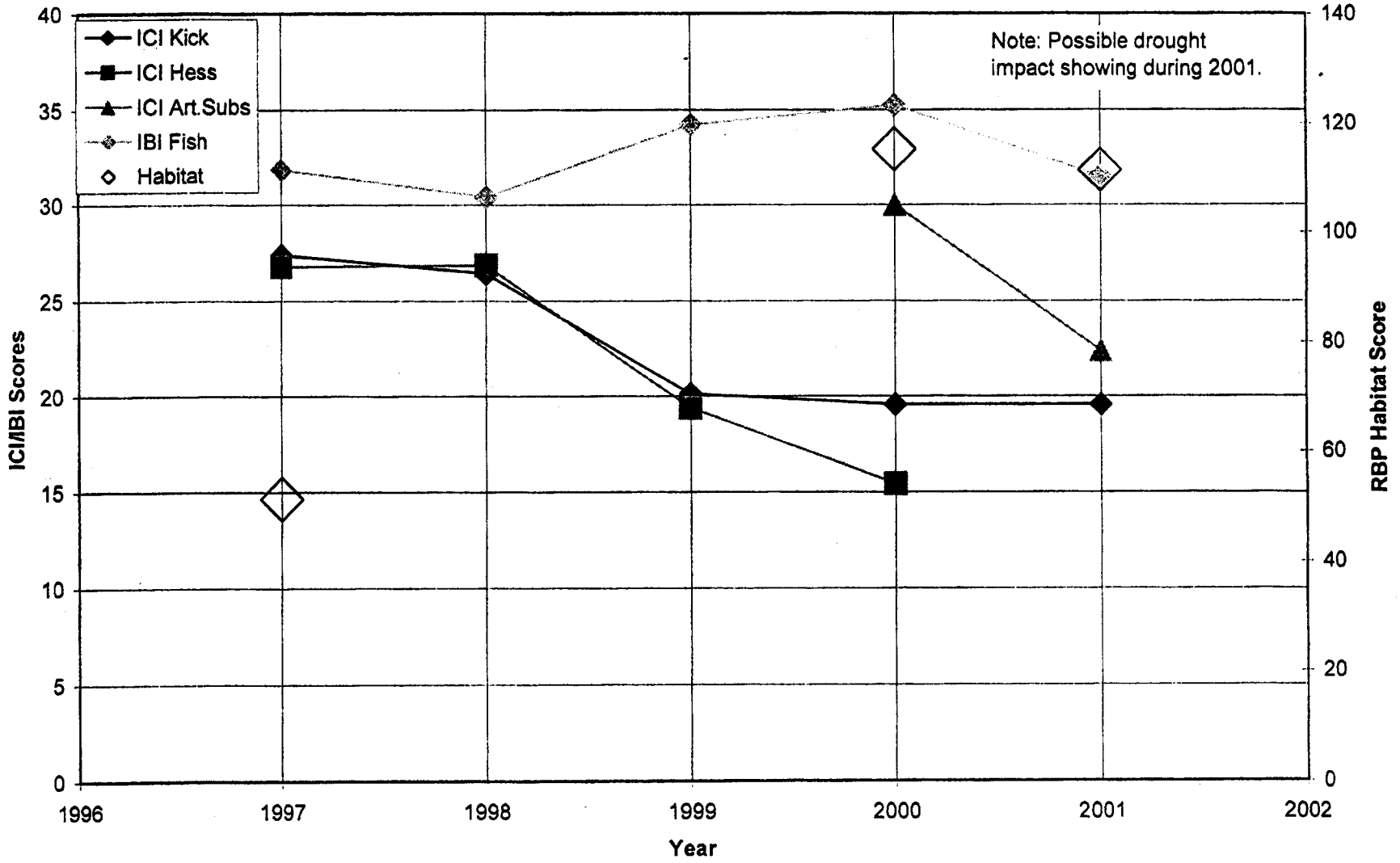
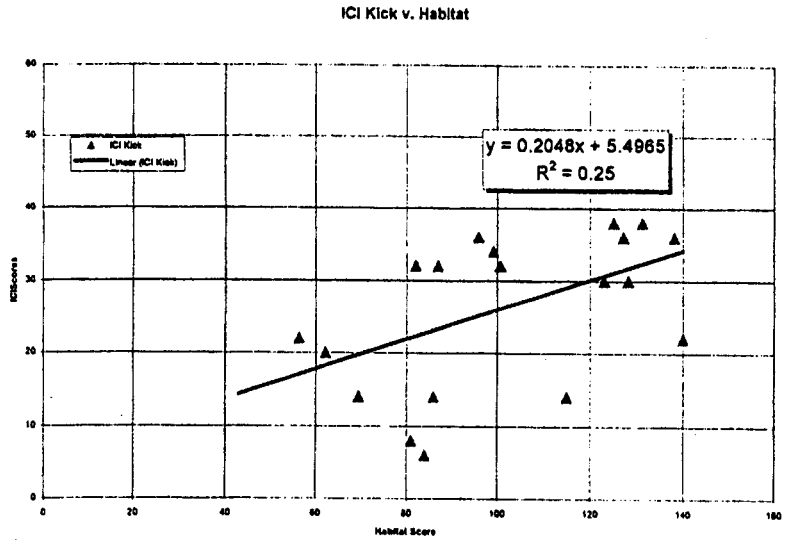
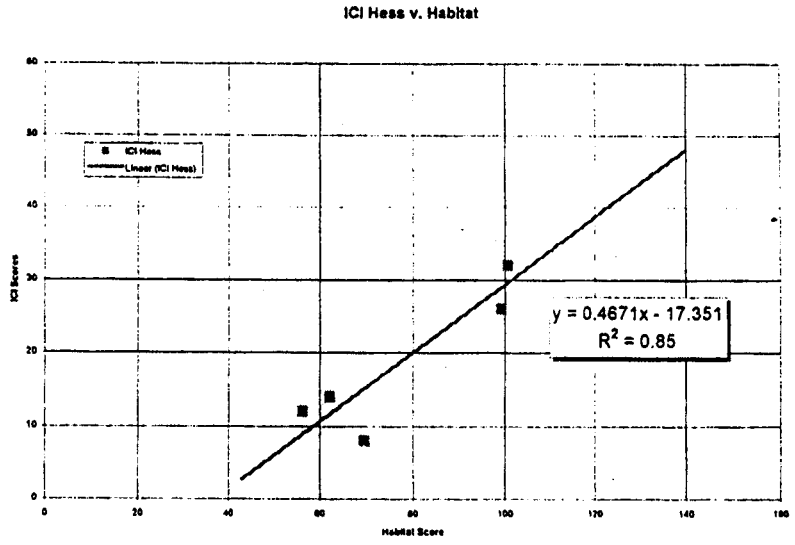


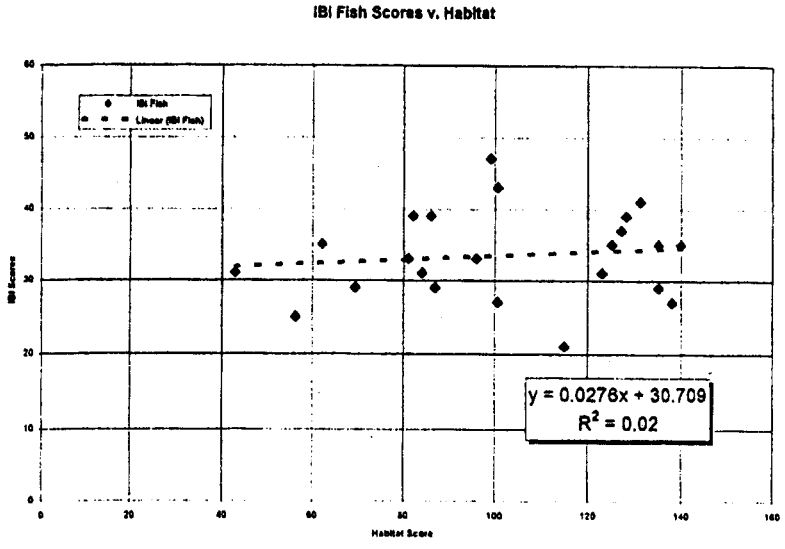
Figure 2
Big Dry Creek Biological Trends Over Time

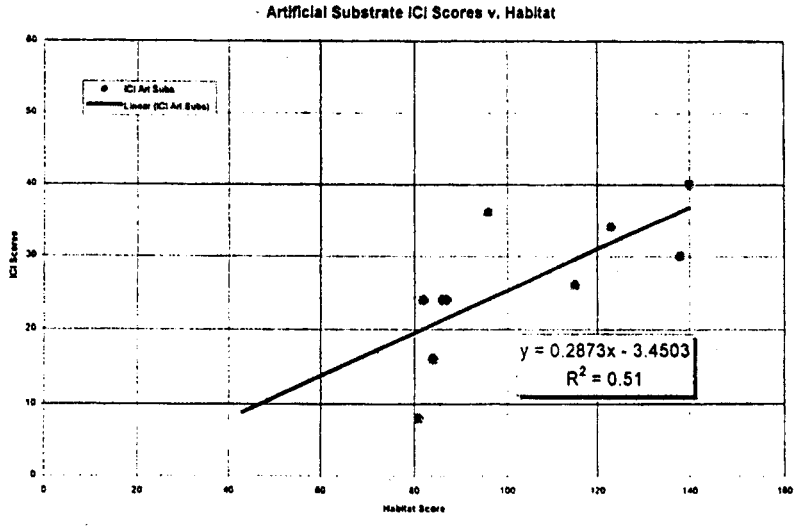


Figures 3a-3d
ICI/IBI Scores vs. Habitat
Big Dry Creek

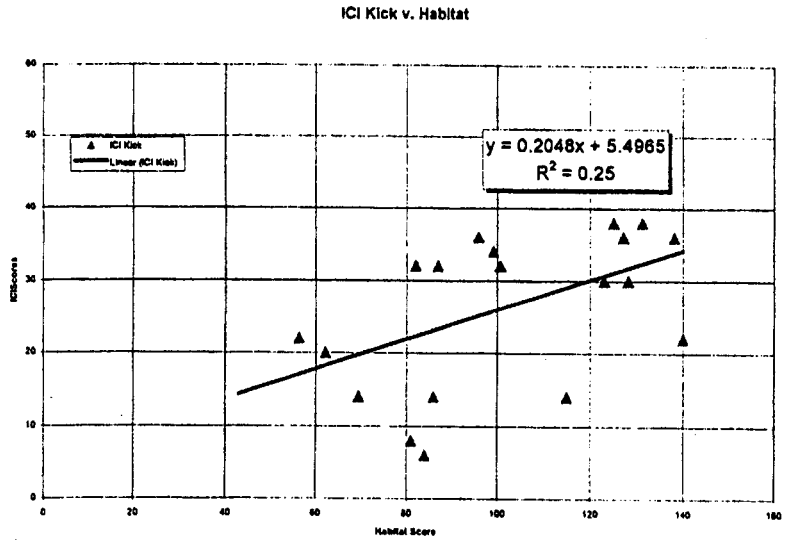


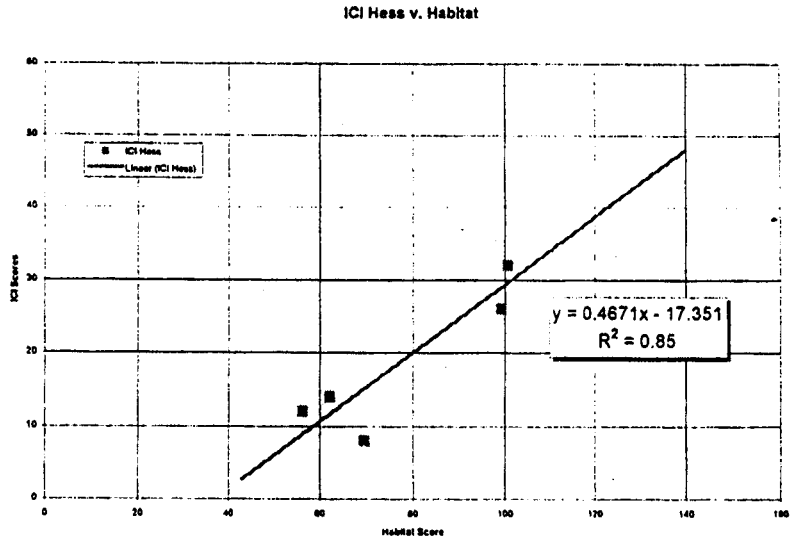


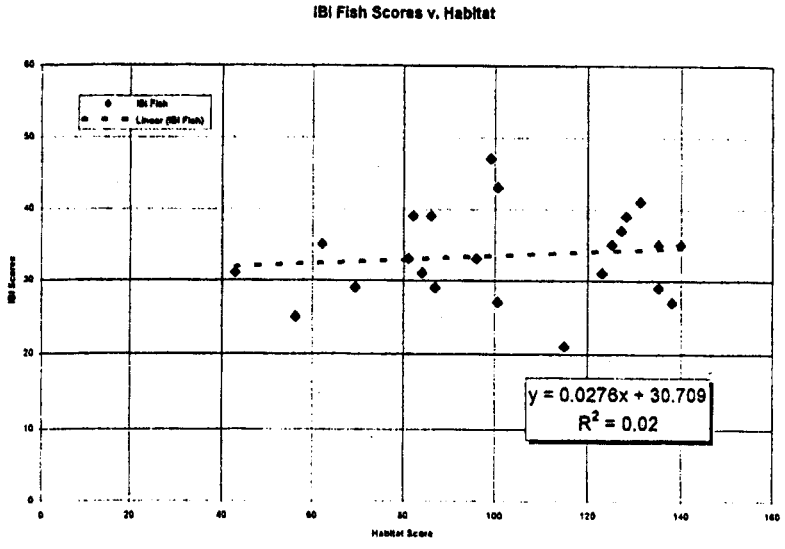


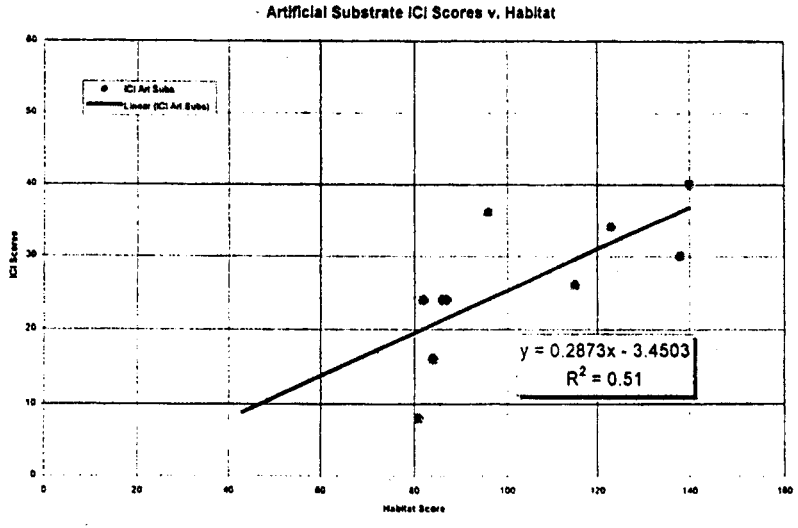


Figures 3a-3d
ICI/IBI Scores vs. Habitat
Big Dry Creek

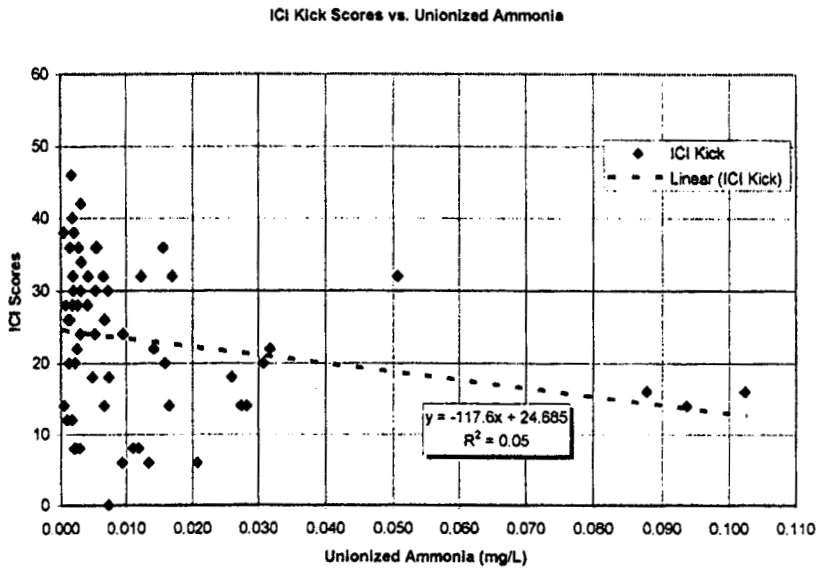


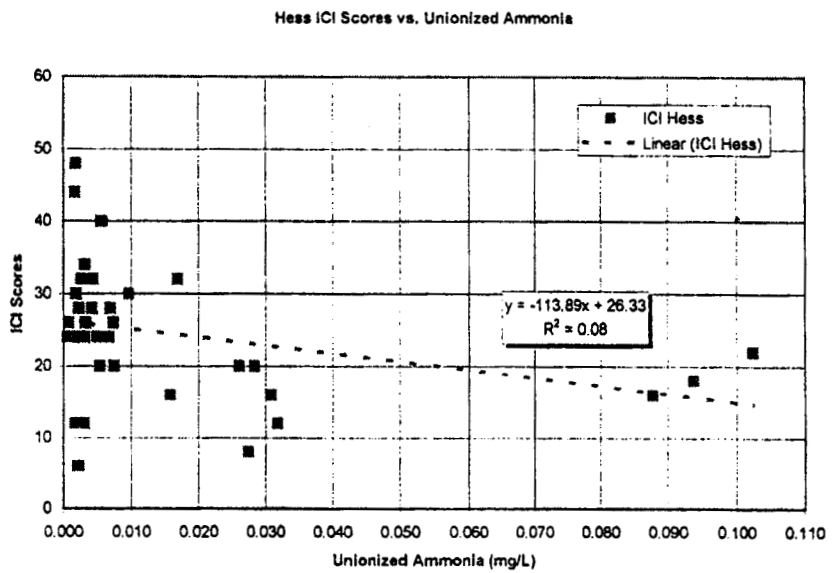


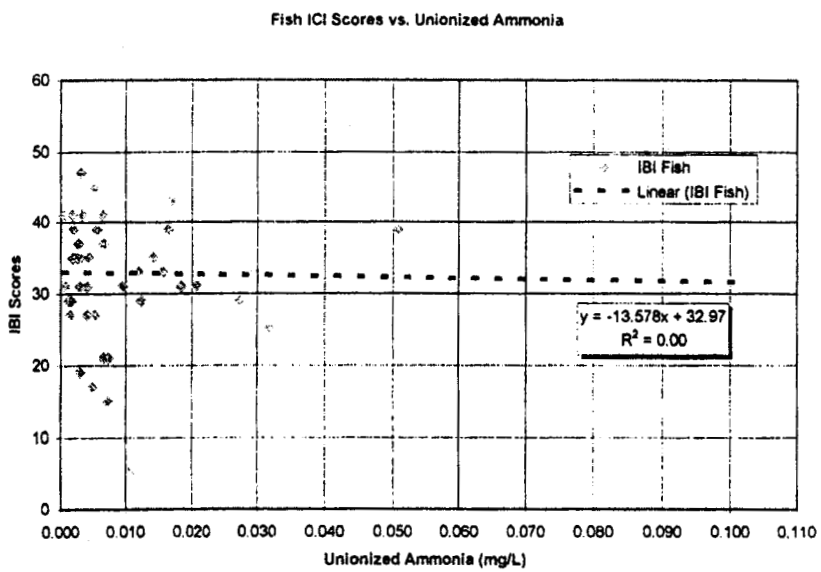


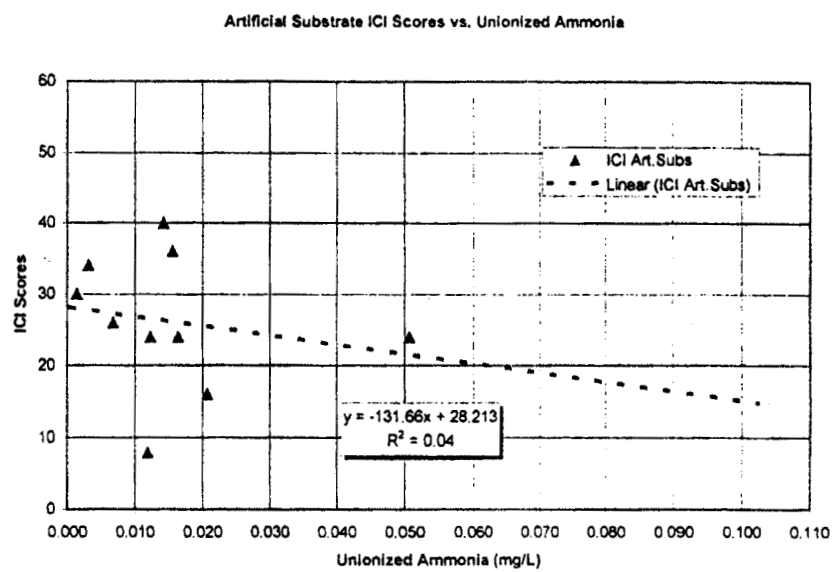


Figues 4a-4d
IBI ICI Scores vs. Unionized Ammonia

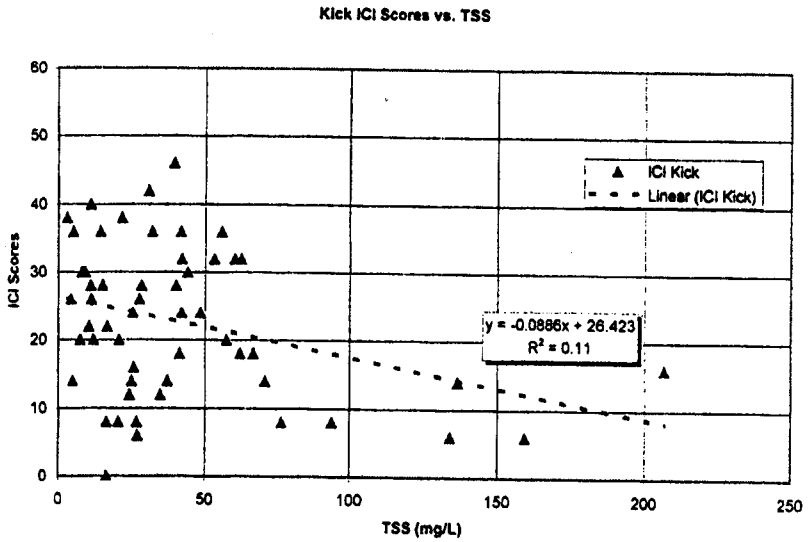


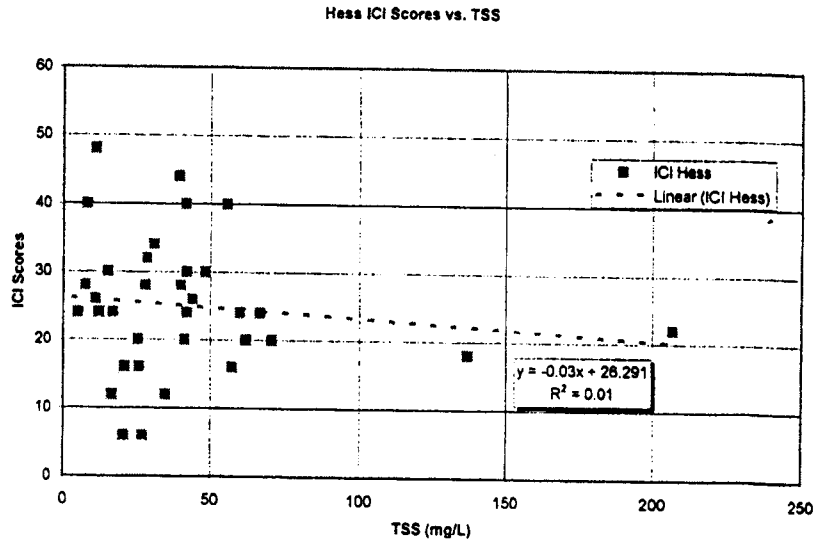


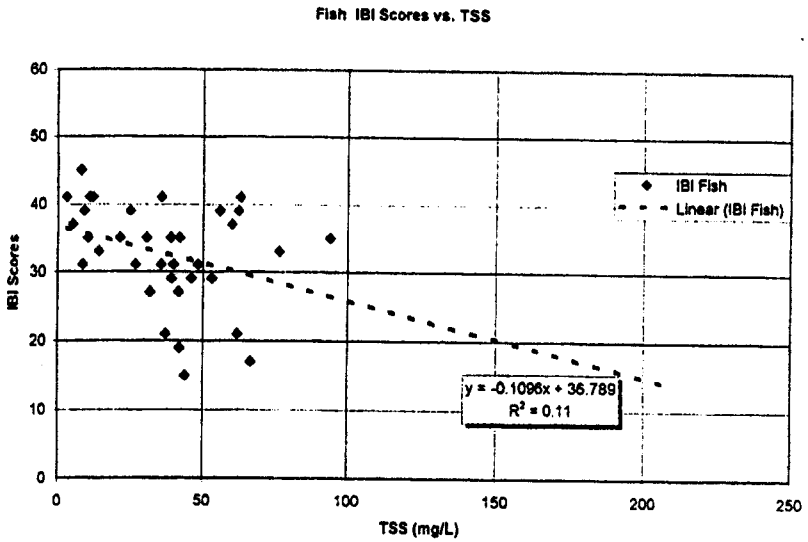


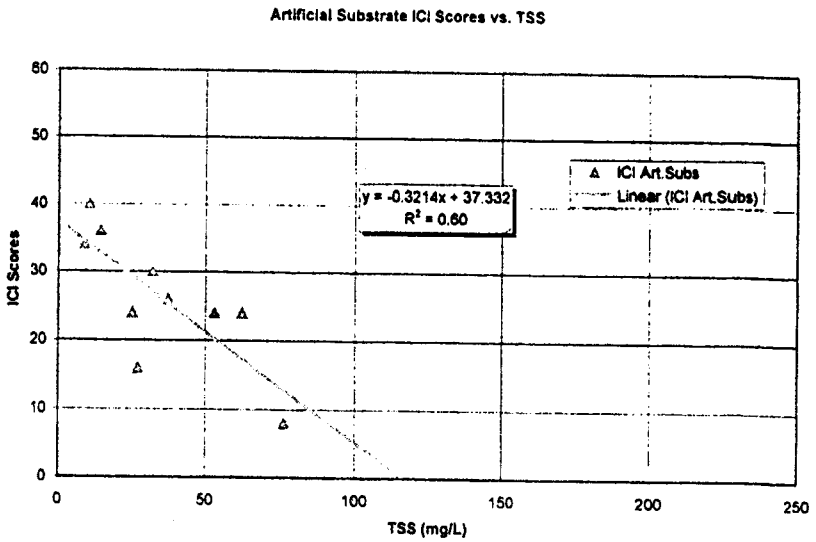


Figures 5a-5d
ICI/IBI Scores vs. TSS

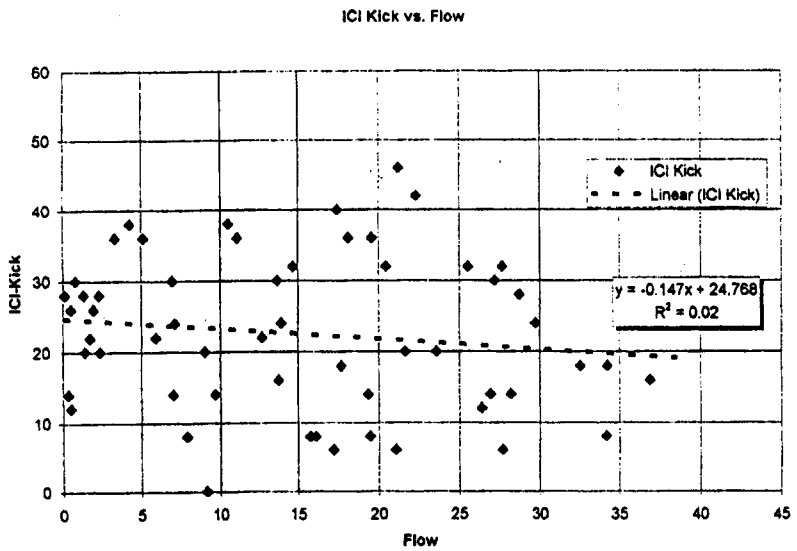


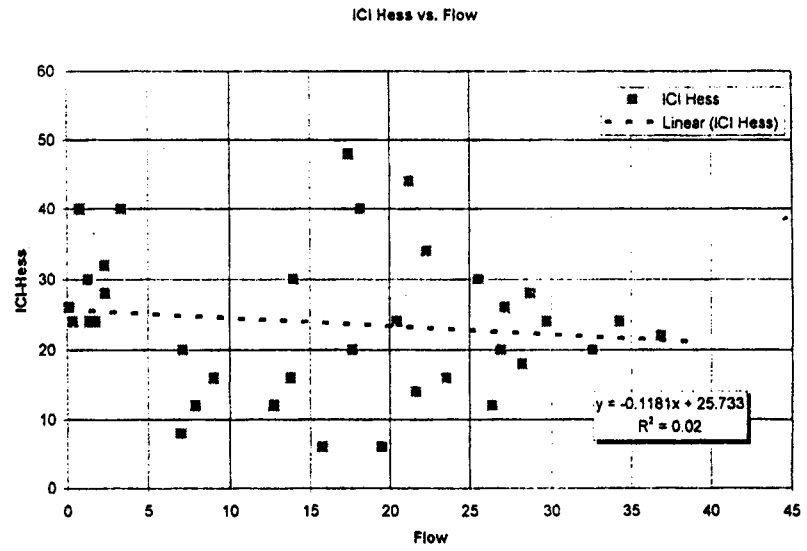


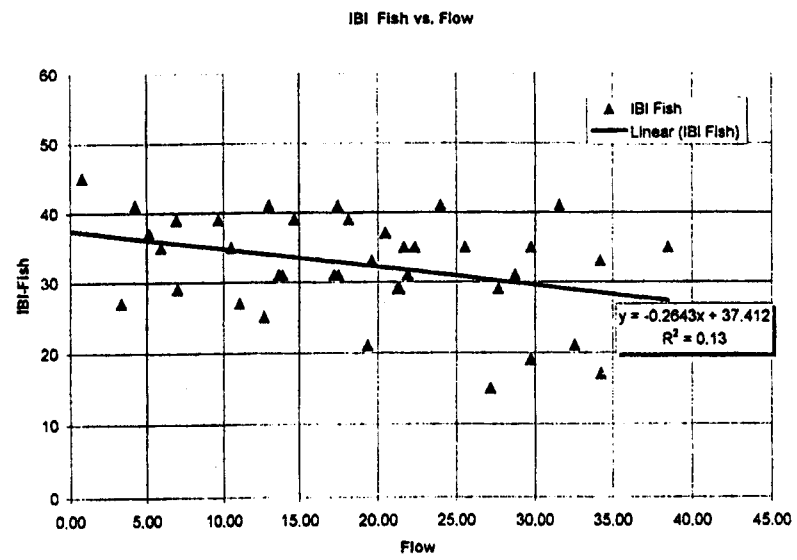


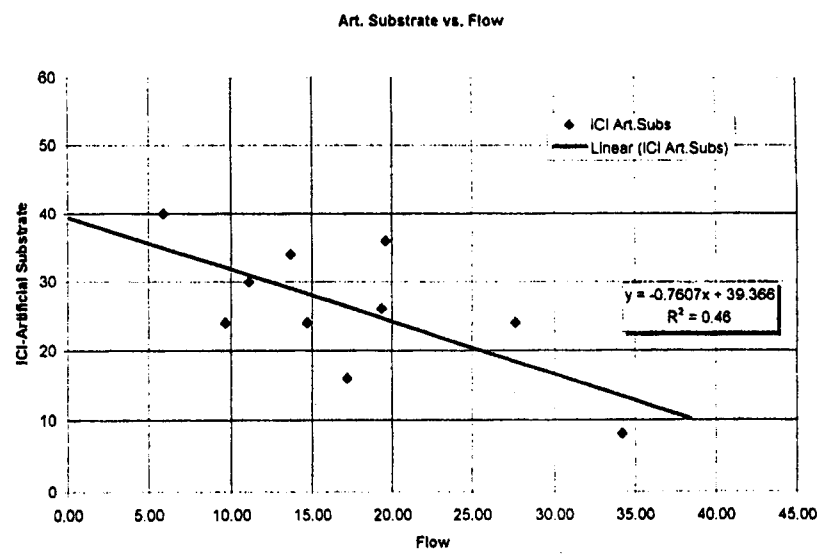


Figures 6a-6d
ICI/IBI Scores vs. Flow

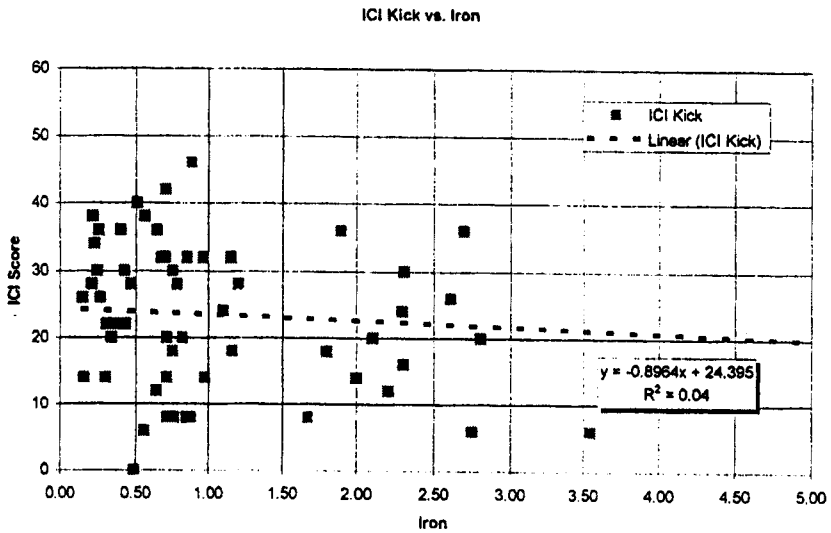


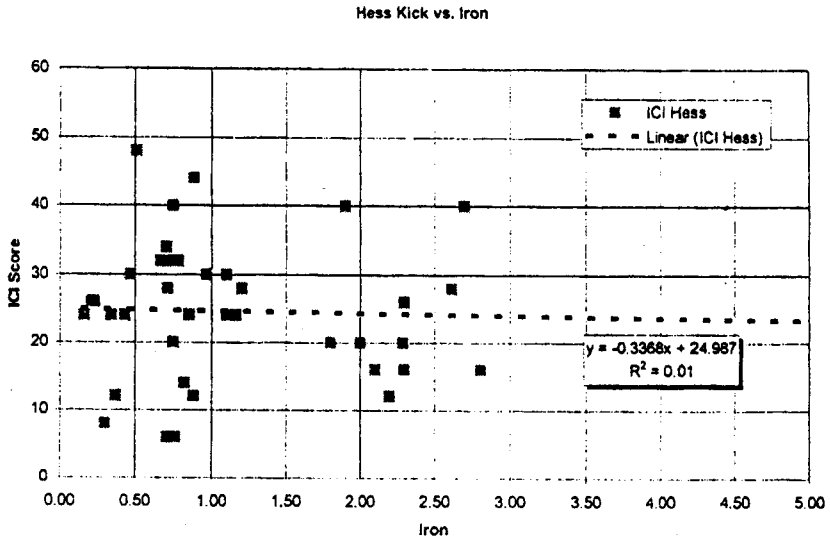


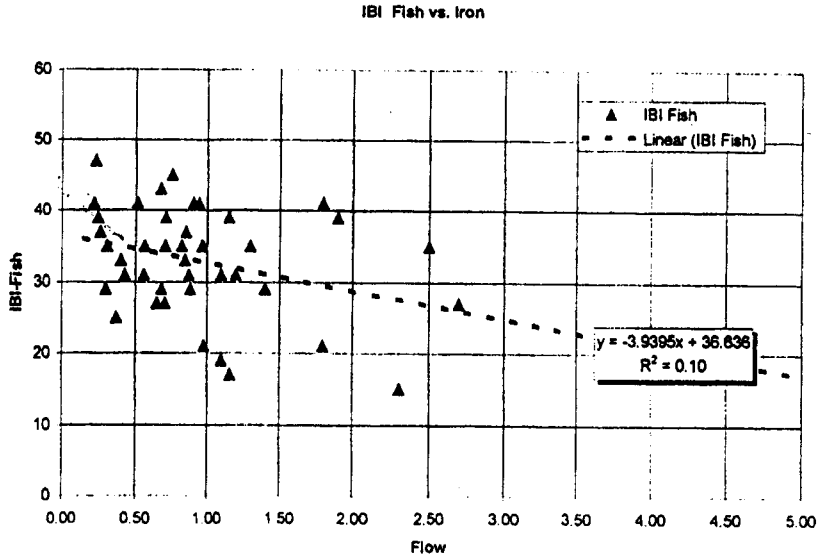




Figures 7a-7d
ICI IBI Scores vs. Iron







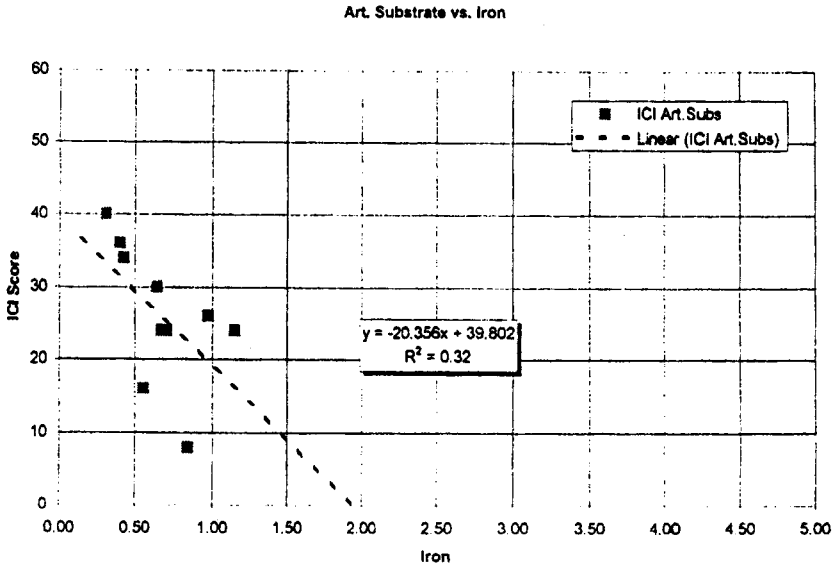
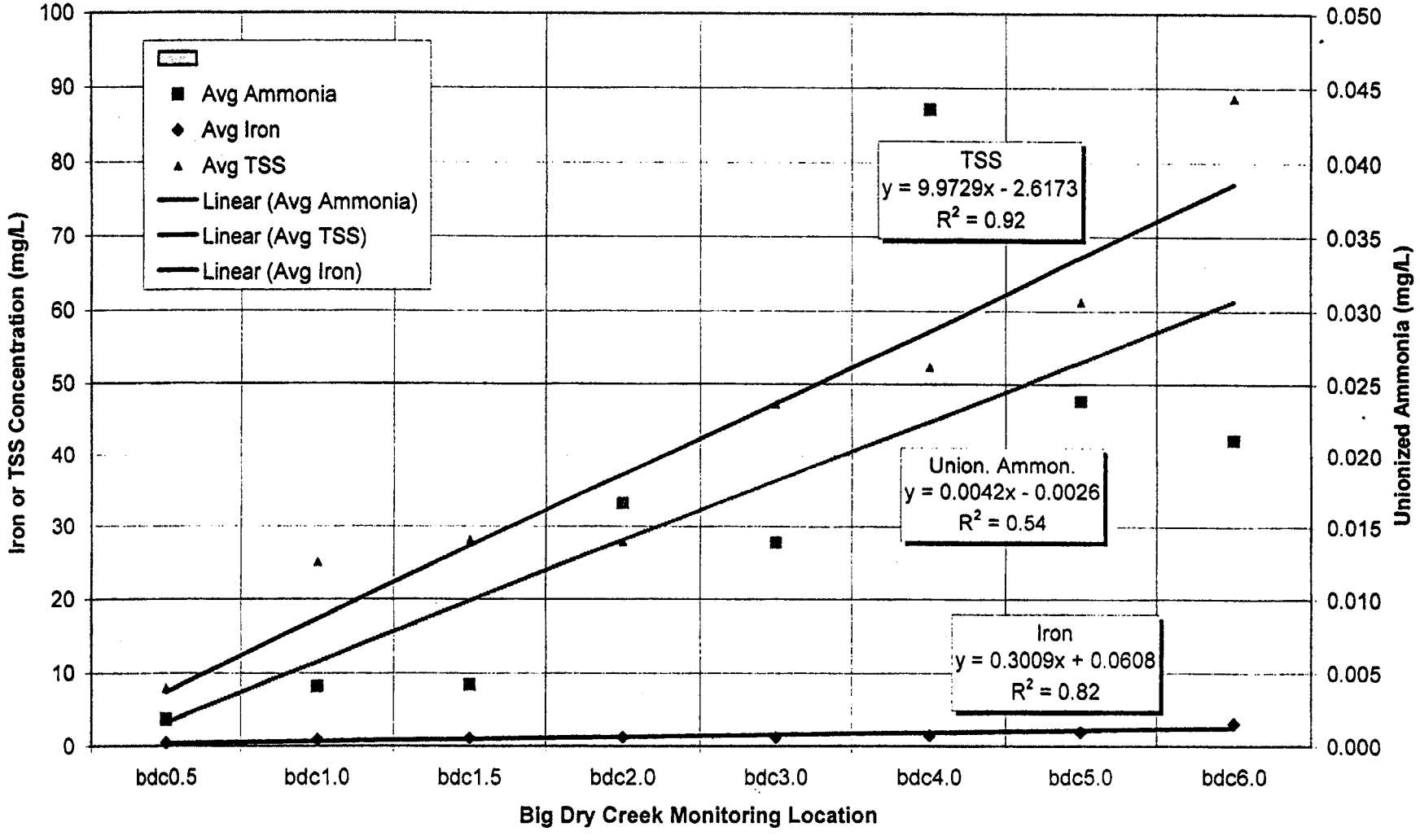


Figure 8
Water Quality Parameters vs. Location



Attachment 1
Big Dry Creek Data
1997-2001

Year	Date	Location	Stream Mile Relative to Standley Lake	Union. Ammonia	Flow	Iron	Se. Diss	TSS	Habitat	Adjusted Habitat	ICI Kick	ICI Hess	ICI Art.Subs	IBI Fish
1997	Spring 1997	bdc0.5	1.5	0.003		0.23			67	99	34	26		47
1997	Spring 1997	bdc1.0	4.3	0.017		0.67			68	101	32	32		43
1997	Spring 1997	bdc1.5	5.8	0.004		0.70			68	101	32	32		27
1997	Spring 1997	bdc2.0	7.7	0.027	6.98	0.30			47	70	14	8		29
1997	Spring 1997	bdc3.0	8.7	0.032	12.72	0.37			38	56	22	12		25
1997	Spring 1997	bdc5.0	16.9	0.018	17.50	0.87			29	43				31
1997	Spring 1997	bdc6.0	22.7		21.63	0.82			42	62	20	14		35
1997	Fall 1997	bdc0.5	1.5	0.005	0.78	0.75		8			30	40		45
1997	Fall 1997	bdc1.0	4.3	0.006	18.15	1.90		56			36	40		39
1997	Fall 1997	bdc1.5	5.8	0.005	3.34	2.70		42			36	40		27
1997	Fall 1997	bdc2.0	7.7	0.007	27.16	2.30		44			30	26		15
1997	Fall 1997	bdc3.0	8.7	0.004	28.71	1.20		40			28	28		31
1997	Fall 1997	bdc5.0	16.9	0.010	13.95	1.10		48			24	30		31
1997	Fall 1997	bdc6.0	22.7	0.007	32.58	1.80		62			18	20		21
1998	Spring 1998	bdc0.5	1.5	0.002	2.35	0.71		8			20	28		
1998	Spring 1998	bdc1.0	4.3	0.005	7.10	2.29		25			24	20		
1998	Spring 1998	bdc1.5	5.8	0.007		2.61		28			26	28		
1998	Spring 1998	bdc2.0	7.7	0.088	13.77	2.30		26			16	16		
1998	Spring 1998	bdc3.0	8.7	0.031	23.56	2.81		57			20	16		
1998	Spring 1998	bdc5.0	16.9	0.094	28.19	9.71		137			14	18		
1998	Spring 1998	bdc6.0	22.7	0.102	36.88	16.43		207			16	22		
1998	Fall 1998	bdc0.5	1.5	0.002	17.43	0.51		11			40	48		41
1998	Fall 1998	bdc1.0	4.3	0.003	22.28	0.70		31			42	34		35
1998	Fall 1998	bdc1.5	5.8	0.002	21.21	0.88		39			46	44		29
1998	Fall 1998	bdc2.0	7.7	0.003	29.71	1.10		42			24	24		19
1998	Fall 1998	bdc3.0	8.7	0.002	25.55	0.96		42			32	30		35
1998	Fall 1998	bdc5.0	16.9	0.007	20.46	0.85		60			32	24		37
1998	Fall 1998	bdc6.0	22.7	0.005	34.26	1.16		67			18	24		17
1999	Spring 1999	bdc0.5	1.5	0.001	0.11	0.21		11			28	26		
1999	Spring 1999	bdc1.0	4.3	0.002	1.29	0.47		15			28	30		
1999	Spring 1999	bdc1.5	5.8	0.003	2.30	0.78		28			28	32		
1999	Spring 1999	bdc2.0	7.7	0.016	9.02	2.10		21			20	16		
1999	Spring 1999	bdc3.0	8.7	0.020	20.56	0.37		21						
1999	Spring 1999	bdc5.0	16.9	0.026	17.67	0.75		41			18	20		
1999	Spring 1999	bdc6.0	22.7	0.028	26.91	2.00		71			14	20		
1999	Fall 1999	bdc0.5	1.5	0.001	13.04	0.94	0.002	12						41
1999	Fall 1999	bdc1.0	4.3	0.001	21.86	1.10	0.002	36						31
1999	Fall 1999	bdc1.5	5.8	0.001	21.36	1.40	0.002	46						29
1999	Fall 1999	bdc2.0	7.7	0.004	29.73	1.30	0.002	39						35
1999	Fall 1999	bdc3.0	8.7	0.007	31.59	0.90	0.006	36						41
1999	Fall 1999	bdc5.0	16.9	0.003	23.94	1.80	0.010	63						41
1999	Fall 1999	bdc6.0	22.7	0.003	38.46	2.50	0.002	94						35
2000	Spring 2000	bdc0.5	1.5	0.001	0.35	0.16	0.002	5			14	24		
2000	Spring 2000	bdc1.0	4.3	0.001	1.40	0.34	0.006	12			20	24		
2000	Spring 2000	bdc1.5	5.8	0.003	1.73	0.43	0.005	17			22	24		
2000	Spring 2000	bdc1.5C	6.2											
2000	Spring 2000	bdc2.0	7.7	0.003	7.89	0.88	0.002	16			8	12		
2000	Spring 2000	bdc3.0	8.7	0.002	19.48	0.76	0.002	27			8	6		
2000	Spring 2000	bdc5.0	16.9	0.002	15.75	0.71	0.002	20			8	6		
2000	Spring 2000	bdc6.0	22.7	0.002	26.36	2.20	0.004	35			12	12		
2000	Fall 2000	bdc0.5	1.5	0.000	4.27	0.22	0.006	3	131	131	38			41
2000	Fall 2000	bdc1.0	4.3	0.003	5.12	0.26	0.010	5	127	127	36			37
2000	Fall 2000	bdc1.5	5.8	0.014	5.91	0.31	0.005	10	140	140	22		40	35
2000	Fall 2000	bdc1.5C	6.2						135	135				35
2000	Fall 2000	bdc2.0	7.7	0.003	13.69	0.43	0.005	9	123	123	30		34	31
2000	Fall 2000	bdc3.0	8.7	0.016	19.61	0.40	0.002	14	96	96	36		36	33
2000	Fall 2000	bdc5.0	16.9	0.016	9.66	0.71	0.004	25	86	86	14		24	39
2000	Fall 2000	bdc6.0	22.7	0.021	17.19	0.56	0.002	27	84	84	6		16	31
2001	Spring 2001	bdc0.5	1.5	0.001	0.50	0.15	0.003	4			26			
2001	Spring 2001	bdc1.0	4.3	0.001	0.50	0.64	0.003	24			12			
2001	Spring 2001	bdc1.5	5.8	0.001	1.94	0.27	0.003	11			26			
2001	Spring 2001	bdc1.5C	6.2											
2001	Spring 2001	bdc2.0	7.7	0.007	9.15	0.49	0.002	16			0			
2001	Spring 2001	bdc3.0	8.7	0.013	21.04	3.55	0.002	134			6			
2001	Spring 2001	bdc5.0	16.9	0.011	16.09	1.67	0.002	94			8			
2001	Spring 2001	bdc6.0	22.7	0.009	27.67	2.75	0.002	159			6			
2001	Fall 2001	bdc0.5	1.5	0.002	6.92	0.25	0.001	9	128	128	30			39
2001	Fall 2001	bdc1.0	4.3	0.002	10.52	0.56	0.001	22	125	125	38			35
2001	Fall 2001	bdc1.5	5.8	0.001	11.10	0.64	0.002	32	138	138	36		30	27
2001	Fall 2001	bdc1.5C	6.2						135	135				29
2001	Fall 2001	bdc2.0	7.7	0.007	19.37	0.97	0.001	37	115	115	14		26	21
2001	Fall 2001	bdc3.0	8.7	0.012	27.65	0.68	0.001	53	87	87	32		24	29
2001	Fall 2001	bdc5.0	16.9	0.051	14.70	1.15	0.001	62	82	82	32		24	39
2001	Fall 2001	bdc6.0	22.7	0.012	34.20	0.84	0.001	76	81	81	8		8	33

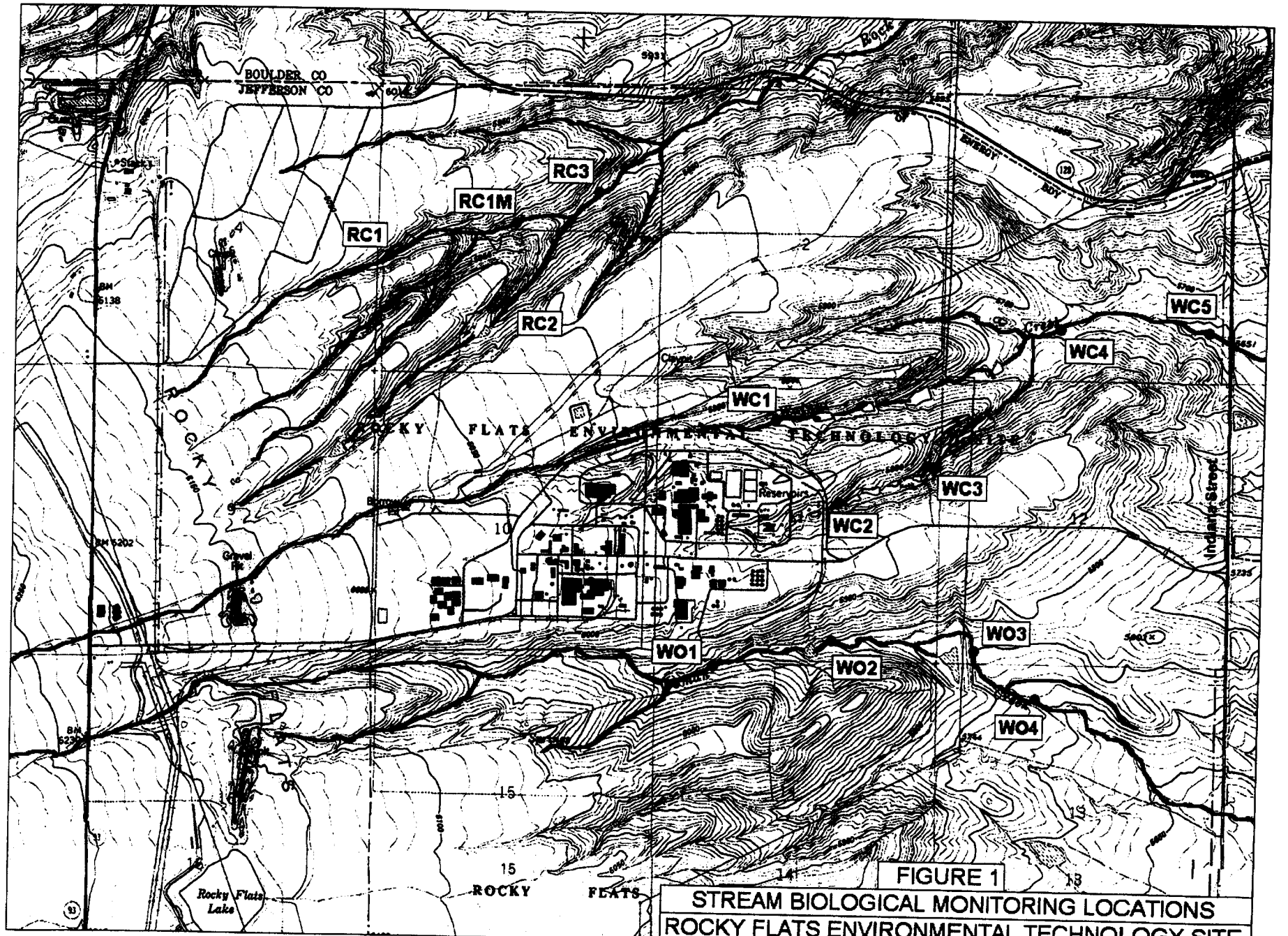


FIGURE 1

STREAM BIOLOGICAL MONITORING LOCATIONS

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

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Department of Energy

ROCKY FLATS FIELD OFFICE
10808 HIGHWAY 93, UNIT A
GOLDEN, COLORADO 80403-8200

03-DOE-01327

OCT 0 1 2003

Steve Gunderson
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Colorado Dept. of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246-1530

Tim Rehder
Rocky Flats Project Manager
U. S. Environmental Protection Agency
999 18th Street, Suite 500
Denver, CO 80202-2466

Dear Mr. Gunderson and Mr. Rehder:

An aquatic monitoring program was initiated by the Department of Energy in the summer of 2001 to document resident aquatic communities and habitat conditions in the three drainages at the Rocky Flats Environmental Technology Site (Site). Biological monitoring was performed at a total of eleven representative sample locations in the Walnut, Woman, and Rock Creek drainages. The monitoring program included fish and benthic macroinvertebrate sampling and an intensive physical habitat assessment at all stations to document conditions for supporting aquatic life. The U.S. Fish and Wildlife Service provided informal comments during the initial stages of the program.

The drought conditions in 2002 adversely affected stream flow conditions in all drainages at the Site. Some streams were dry at several sampling locations, which limited the extent of biological and habitat monitoring conducted during 2002. The 2002 monitoring results document habitat conditions and the status of aquatic communities in drainages at the Site during extremely low water years under existing flow regimes.

Enclosed for your information is one copy of the report entitled "Results of the Aquatic Monitoring Program in Streams at the Rocky Flats Site, Golden, Colorado 2001-2002". The report documents the results of the aquatic monitoring program at the Site for Calendar Years 2001 and 2002 and was prepared by Aquatics Associates for the U.S. Department of Energy, Rocky Flats Field Office. If you any questions, please contact John Stover at 303-966-9735 or John Rampe at 303-966-6246.

Sincerely,

Joseph A. Legare, Assistant Manager
for Environment and Stewardship

Enclosure

cc w/Enc:
A. Ross, CDPHE
R. Nininger, K-H
S. Garcia, City of Broomfield
A. Nelson, City of Westminster
J. Henderson, RFCAB
M. Anderson, RFCLOG
J. Clary, BDCWA

cc w/o Enc:
S. Johnson, CDPHE, WQCD
J. Stover, RFFO
S. Bell, RFFO
C. Deck, K-H

TABLE 1

BIOLOGICAL MONITORING SITES IN THE WALNUT, WOMAN, AND ROCK CREEK DRAINAGES AT ROCKY FLATS, 2001 AND 2002

Study Site	Location	Existing Flow Characteristics 1/
WALNUT CREEK		
WC1	North Walnut Creek below SW093, above A-1 Bypass	*P*
WC2	South Walnut Creek near GS10, above B-1 Bypass	*P*
WC3	South Walnut Creek downstream from Pond B-4, upstream from Pond B-5	*ED*
WC4	Mainstem Walnut Creek downstream from the confluence of North and South Walnut Creeks, downstream from terminal ponds and No Name Gulch	*DD*
WC5	Maintsem Walnut Creek upstream from GS03 and Indiana Street Pond	*DD*
WOMAN CREEK		
WO1	Woman Creek downstream from the confluence with Antelope Springs Creek, upstream from Pond C-1	*P*
WO2	Woman Creek downstream from Pond C-1	*P*
WO3	Pond C-2 Bypass, near toe of dam	*I*
WO4	Woman Creek downstream from Pond C-2, downstream from Mower Ditch	*I*
ROCK CREEK		
RC1	North Fork of Middle Fork Rock Creek	*P*
RC1M 2/	North Fork of Middle Fork Rock Creek upstream from confluence with Mainstem Rock Creek	*P*
RC2	Maintsem Rock Creek downstream from Lindsey Pond	*I*
RC3	Maintsem Rock Creek upstream from the confluence with the North and South Forks of Rock Creek	*I*

1/ Perennial, intermittent, effluent-dominated, and discharge-dependent flow characteristics are denoted by *P*, *I*, *ED*, and *DD*, respectively.
2/ Site RC1M was added to monitoring program in spring 2002.

TABLE 2

SAMPLING OCCASIONS AND TYPES OF SAMPLES COLLECTED AT WALNUT, WOMAN, AND ROCK CREEK MONITORING SITES AT ROCKY FLATS, 2001 AND 2002 1/

	2001		2002		
Study Site	summer	fall	spring	summer	fall
WALNUT CREEK					
WC1	*M, F*	*M, H*	*M*	*M*	*M, H*
WC2	*M, F*	*M, H*	*M*	*M*	*M, H*
WC3	*M, F*	*M, H*	*M*	*M*	*M, H*
WC4	*M, F*	*M, F, H*	*M*	dry	*M, H*
WC5	*M, F*	*M, F, H*	*M*	dry	*M, H*
WOMAN CREEK					
WO1	*M, F*	*M, H*	*M*	*M*	*M, H*
WO2	*M, F*	*M, H*	*M*	*M*	*M, H*
WO3	dry	*M, H* 2/	*M*	dry	*M, H*
WO4 3/	dry	not sampled	dry	dry	dry
ROCK CREEK					
RC1	*M*	*M, H*	*M*	*M*	*M, H*
RC1M 4/			*M*	*M*	*M, H*
RC2	*M, F*	*M, H*	*M*	*M*	*M, H*
RC3	*M, F*	*M, F, H*	*M*	dry	*M, H*

1/ Macroinvertebrate, fish, and habitat sampling are denoted by *F, M, HD*, and *H*, respectively.
2/ Qualitative habitat observations only at site WO3.
3/ Site WO4 was dry on most sampling occasions. Only remnant pools were observed in fall 2001, and sampling was not warranted.
4/ Site RC1M was added to monitoring program in spring 2002.

2.0 METHODS

2.1 PHYSICAL HABITAT

Physical habitat characteristics were measured in the fall. Physical data were collected in the immediate areas where fish and benthic macroinvertebrates were sampled. The assessment of habitat characteristics was performed to document annual changes in physical habitat considering site closure activities and to provide supplemental data for distinguishing between habitat and water quality effects on fish and macroinvertebrate communities inhabiting the various study sites.

Physical parameters were evaluated according to the most recent methods outlined for the Rapid Bioassessment Protocol (RBP) habitat assessment for low gradient streams (Barbour et al. 1999). This analysis allows for determining habitat differences between sites and documenting yearly changes at individual stream sites. The RBP analysis incorporates ten habitat parameters including available cover, pool substrate characterization, pool variability, sediment deposition, channel flow status, channel alteration, sinuosity, bank stability (erosion), bank vegetation protection, and riparian vegetation zone width. These habitat variables were measured in the field, and each parameter was rated as *optimal*, *suboptimal*, *marginal*, or *poor* based the data collected and scoring ranges designated for the RBP habitat assessment (Barbour et al. 1999). A total habitat assessment score was then calculated for each site by adding the ten habitat parameter scores. Habitat assessment scores may potentially range between 0 and 200, with higher scores generally indicating better habitat quality.

The presence and abundance of most fish and benthic macroinvertebrate species inhabiting a given stream reach are in part influenced by substrate composition and the relative amounts of macro-habitat (riffle, run, pool) available. Consequently, substrate composition and macro-habitat were also measured at study sites to supplement the RBP habitat analysis. Substrate particle size distribution was quantitatively measured at each site using the Wolman pebble count technique (Wolman 1954). Substrate particles were randomly selected and measured using a gravelometer template while traversing back and forth across transects until at total of 100 measurements were collected. Pebble count data were analyzed to determine the particle size distribution at each site for comparison with biological sampling results. Photographs of study sites were taken to document habitat conditions, and general habitat descriptions and observed changes were also recorded on all sampling occasions.

2.2 FISH POPULATIONS

Fish populations were sampled in the summer and/or fall, at study locations where flows were adequate for sampling. Backpack electroshocking equipment with one negative and one positive mobile electrode was used at each station. Fish were collected in one thorough pass through each representative stream reach. All fish captured were identified, counted, measured, and released to the stream unharmed. For each species, lengths and weights were measured for all individuals collected. When a large number of a single species was collected, specimens were counted and weighed collectively after a representative sample of individual fish was measured. Individuals were visually examined and the incidence of disease was recorded.

Sampling areas were representative of the stream reach and were of sufficient length to include all macro-habitats (riffle, run, pool) present. Natural physical barriers (very shallow depths over the riffle) prevented fish from moving into or out of the study reach. Study sites boundaries were permanently marked with rebar. The length of study areas ranged from approximately 44 to 169 meters (145 to 555 feet). Stream widths were measured at 9-meter (30 feet) intervals throughout each study section. Average stream widths ranged from approximately 0.6 to 1.7 meters (2.0 to 5.7 feet). Average stream width and total station length were used to calculate the area sampled. General site characteristics encountered at the time of sampling were recorded.

A list of fish species collected including the number collected, mean lengths and weights, and the number of age classes represented were determined for all study sites. More extensive fish population analyses (i.e. Index of Biotic Integrity) were inappropriate because of the lack of species diversity and low abundance. Such analyses may be performed a later date, if applicable, based on future sampling results.

2.3 MACROINVERTEBRATES

Macroinvertebrate sampling was performed in the spring, summer, and fall. Sampling was performed according to methods outlined by Klemm et al. (1990) and the Colorado Water Quality Forum (1995). Benthic macroinvertebrates were collected from representative aquatic habitats (riffle, run, pool, and bank) found at each site using a kick net with a mesh size of 425 microns (*um*). Kick net samples were collected from either a one-half or one-square meter area from representative habitats and were combined into one composite sample for analysis. The material collected in all samples was carefully placed into labeled sample containers and preserved with 10% formalin in the field. Samples were transported to the

laboratory for analysis. The feasibility of using artificial substrates (Hester-Dendy) sampling as an additional sampling method was evaluated based on observed water depth and flow conditions at each site.

Identification of macroinvertebrates and laboratory techniques were performed according to the methods outlined in Klemm et al. (1990). In the laboratory, samples were thoroughly rinsed of excess preservative and debris in a 500 *um* sieve before being placed in a white tray for processing. All macroinvertebrates were removed from the debris with forceps and placed in labeled vials filled with 80% ethanol. Macroinvertebrates were identified to the lowest taxonomic level possible with the aid of both binocular dissecting and compound microscopes using the appropriate taxonomic literature presented in Section 6.0. A macroinvertebrate reference collection was prepared, which contains representative specimens of each taxon in vials of 80% ethanol or on permanent slide mounts with Euparal or PVA (polyvinyl alcohol). Any new taxa encountered in future collections will be added to this project's reference collection.

Following identification and enumeration, a species list including the number of organisms collected, total density, total number of taxa, relative abundance, and diversity were calculated for each sample. Other community parameters were also calculated according to methods outlined for the Rapid Bioassessment Protocol III (RBP) analysis although reference site comparisons were deemed inappropriate (Barbour et al. 1999, Plafkin et al. 1989). The RBP metrics calculated included taxa richness, the modified Hilsenhoff Biotic Index (HBI), ratio of scrapers to filtering collector feeding groups, ratio of EPT to Chironomidae abundances, percent dominant taxon, the EPT Index, and the ratio of the shredder feeding group to the total number of individuals collected. Tolerance values used in the HBI incorporate values presented by Barbour et al. (1999), MDEQ (1996), Bode (1988), and Wetzel et al. (2000) which are applicable to Colorado streams. The HBI measures macroinvertebrate community responses to organic pollution. HBI values may range from 0 to 10, with higher values (generally >6) indicating higher degrees of organic pollution. The functional feeding group designations used were as provided by Barbour et al. (1999) and Merritt and Cummins (1996).

The Invertebrate Community Index (ICI) was also included in the evaluation of macroinvertebrate data to provide an additional objective measure of biological condition at study sites. ICI values were calculated according to methods outlined by DeShon (1995), which provide the detailed methodology used by the Ohio EPA for assessing the biological condition of streams in Ohio and the surrounding region. The ICI analysis involves scoring ten different metrics with the sum of these metrics providing the final index score. The metrics used include: 1) total number of taxa, 2) number of mayfly taxa, 3) number of caddisfly taxa, 4) number of dipteran taxa, 5) percent mayflies, 6) percent caddisflies, 7) percent of tribe

Tanytarsini midges, 8) percent other dipteran and non-insects, 9) percent tolerant organisms, and 10) number of qualitative ET (Ephemeroptera and Trichoptera) taxa. Each of these metrics is given a score of 6, 4, 2, or 0 depending on the value derived from macroinvertebrate data for each station. For tolerant species designations, any species with an HBI rating of 8 or higher was considered tolerant. Individual metric scores were determined by comparing derived values with species area plots for the reference data versus drainage area. A score of 6 for a given metric indicates the metric value is within the range exhibited by very good or exceptional aquatic communities, a score of 4 indicates that the value is characteristic of more typical or good communities, a score of 2 indicates the value is moderately deviating from the expected range of good to exceptional values, and a score of 0 indicates the value is strongly deviating from expected good or exceptional values. Final ICI scores were calculated for each site, and may range from 0 to 60. Corresponding benthic community condition ratings developed for the ICI are: *exceptional* (46-60), *good* (36-45), *fair* (13-35), and *poor* (0-12) (DeShon 1995).

3.0 RESULTS

3.1 PHYSICAL HABITAT

Physical habitat characteristics for sites in the Walnut, Woman, and Rock Creek drainages at Rocky Flats and the results of the Rapid Bioassessment Protocol (RBP) habitat assessment are provided herein. RBP habitat assessment results are summarized in Tables 3, 4, and 5 for the fall 2001 and 2002 sampling occasions for sites on Walnut, Woman, and Rock Creeks, respectively. Habitat assessments were conducted at all sites on Walnut and Rock Creeks, and at only two of the four sites on Woman Creek. Quantitative habitat assessments could not be performed at sites WO3 and WO4 on Woman Creek due to the lack of water; however, reconnaissance level surveys were conducted at these sites in conjunction with habitat measurement and macroinvertebrate sampling events. Total habitat assessment scores and individual parameter scores and their corresponding condition categories are presented in the tables for the ten habitat parameters incorporated in the assessment. This assessment was performed during the months of October and November in 2001 and 2002; consequently, total scores reflect the flow conditions typical of the fall season. Additional results are also provided for summer conditions based on observations made concurrent with the biological sampling conducted in the summer of 2001 and 2002. Photographs of study sites and habitat features are provided in Appendix A, and substrate particle size distribution plots are provided in Appendix B.

3.1.1 Walnut Creek

Site W1 is located in the upper reaches of North Walnut Creek, below SW093 and above the A-1 Bypass (Figure 1 and Table 1). This site is also downstream from the discharge of the Solar Pond Plume ground water treatment system. The water was usually clear, and discharges were typically low on most sampling occasions although a significant increase in discharge and turbidity was observed at this site during a storm event in August 2001. Alternating riffle-run and pool habitats with small to medium cobble, course gravel, and sand substrates were predominant. Riffle-run areas were shallow, while pools were moderate to large in size and relatively deep (0.5-3 feet). The channel is heavily shaded by trees and shrubs, which somewhat limit periphytic and filamentous algae growth. A diverse mix of grasses and other non-woody vegetation is also present. About half of the reach has steep vertical banks with exposed soils, which increase the potential for erosion particularly during storm events.

TABLE 3

SUMMARY OF RAPID BIOASSESSMENT PROTOCOL (RBP) HABITAT ASSESSMENT SCORES FOR WALNUT CREEK SITES, FALL 2001 AND 2002

WALNUT CREEK

Habitat Parameter	WC1 Score	WC1 Condition Category	WC2 Score	WC2 Condition Category	WC3 Score	WC3 Condition Category	WC4 2/ Score	WC4 2/ Condition Category	WC5 2/ Score	WC5 2/ Condition Category
Bottom Substrate/ Available Cover	14	Suboptimal	17	Optimal	13	Suboptimal	11	Suboptimal	12	Suboptimal
Pool Substrate Characterization	16	Optimal	17	Optimal	11	Suboptimal	14	Suboptimal	13	Suboptimal
Pool Variability	16	Optimal	11	Suboptimal	11	Suboptimal	11	Suboptimal	16	Optimal
Sediment Deposition	18	Optimal	16	Optimal	18	Optimal	18	Optimal	17	Optimal
Channel Flow Status 1/	17	Optimal	17	Optimal	18	Optimal	18	Optimal	18	Optimal
summer condition	11	Suboptimal	7	Marginal	18	Optimal	n/a		n/a	
Channel Alteration	19	Optimal	15	Suboptimal	19	Optimal	19	Optimal	19	Optimal
Channel Sinuosity	7	Marginal	6	Marginal	6	Marginal	8	Marginal	8	Marginal
Bank Stability 3/										
2001	4	L-Marginal	3	L-Marginal	1	L-Poor	4	L-Marginal	1	L-Poor
	4	R-Marginal	3	R-Marginal	1	R-Poor	4	R-Marginal	2	R-Poor
2002	no change		no change		0	L-Poor	2	L-Poor	3	L-Marginal
					0	R-Poor	3	R-Marginal	4	R-Marginal
Bank Vegetative Protection	9	L-Optimal	7	L-Suboptimal	8	L-Suboptimal	8	L-Suboptimal	8	L-Suboptimal
	9	R-Optimal	7	R-Suboptimal	8	R-Suboptimal	9	R-Optimal	9	R-Optimal
Riparian Vegetation Zone Width	10	L-Optimal	3	L-Marginal	9	L-Optimal	10	L-Optimal	10	L-Optimal
	10	R-Optimal	8	R-Suboptimal	9	R-Optimal	10	R-Optimal	10	R-Optimal
Total Scores 2001	153		130		132		144		143	
2002	no change		no change		130		141		147	
Summer Condtions	147		120		130		n/a		n/a	

1/ Channel flow status observed during summer conditions.
2/ Scores at sites WC4 and WC5 when discharges from terminal ponds occurring; otherwise channel dry (total score = 0).
3/ Bank stability was the only habitat parameter that changed between the fall 2001 and 2002 assessments.

TABLE 4

SUMMARY OF RAPID BIOASSESSMENT PROTOCOL (RBP) HABITAT ASSESSMENT SCORES FOR WOMAN CREEK SITES, FALL 2001 AND 2002 1/

WOMAN CREEK

Habitat Parameter	WO1 Score	WO1 Condition Category	WO2 Score	WO2 Condition Category	WO3 Score	WO3 Condition Category	WO4 Score	WO4 Condition Category
Bottom Substrate/ Available Cover	14	Suboptimal	15	Suboptimal				
Pool Substrate Characterization	16	Optimal	16	Optimal				
Pool Variability	10	Marginal	16	Optimal	qualitative measurements only 3/		lack of water precluded quantitative assessment 4/	
Sediment Deposition	18	Optimal	18	Optimal				
Channel Flow Status 2/	18	Optimal	18	Optimal				
summer conditions	8	Marginal	8	Marginal				
Channel Alteration	19	Optimal	19	Optimal				
Channel Sinuosity	6	Marginal	6	Marginal				
Bank Stability	10	L-Optimal	8	L-Suboptimal				
	10	R-Optimal	6	R-Suboptimal				
Bank Vegetative Protection	9	L-Optimal	9	L-Optimal				
	9	R-Optimal	9	R-Optimal				
Riparian Vegetation Zone Width	9	L-Optimal	9	L-Optimal				
	9	R-Optimal	9	R-Optimal				
Total Score	157		158					
Summer Conditions	147		148					

1/ No change in habitat parameters observed between the fall 2001 and 2002 assessments.
2/ Channel flow status observed during summer conditions.
3/ Water only occasionally present; thus, quantitative habitat assessment not warranted at site WO3.
4/ Quantitative habitat assessment may be performed at site WO4 in future based on water availability.

TABLE 5

SUMMARY OF RAPID BIOASSESSMENT PROTOCOL (RBP) HABITAT ASSESSMENT SCORES FOR ROCK CREEK SITES, FALL 2001 AND 2002 1/

ROCK CREEK

Habitat Parameter	RC1 Score	RC1 Condition Category	RC1M 2/ Score	RC1M 2/ Condition Category	RC2 Score	RC2 Condition Category	RC3 Score	RC3 Condition Category
Bottom Substrate/ Available Cover	3	Poor	13	Suboptimal	8	Marginal	14	Suboptimal
Pool Substrate Characterization	11	Suboptimal	17	Optimal	13	Suboptimal	18	Optimal
Pool Variability	1	Poor	16	Optimal	14	Suboptimal	16	Optimal
Sediment Deposition	19	Optimal	18	Optimal	18	Optimal	18	Optimal
Channel Flow Status 3/	18	Optimal	18	Optimal	18	Optimal	18	Optimal
summer conditions	16	Optimal	7	Marginal	1	Poor	0	Poor
Channel Alteration	19	Optimal	19	Optimal	19	Optimal	19	Optimal
Channel Sinuosity	7	Marginal	6	Marginal	6	Marginal	8	Marginal
Bank Stability	10	L-Optimal	8	L-Suboptimal	10	L-Optimal	10	L-Optimal
	10	R-Optimal	8	R-Suboptimal	10	R-Optimal	10	R-Optimal
Bank Vegetative Protection	8	L-Suboptimal	10	L-Optimal	8	L-Suboptimal	10	L-Optimal
	8	R-Suboptimal	10	R-Optimal	8	R-Suboptimal	10	R-Optimal
Riparian Vegetation Zone Width	10	L-Optimal	10	L-Optimal	10	L-Optimal	10	L-Optimal
	9	R-Optimal	10	R-Optimal	10	R-Optimal	10	R-Optimal
Total Score	133		163		152		171	
Summer Conditions	131		152		135		153	

1/ No change in habitat parameters observed between the fall 2001 and 2002 assessments.
2/ Site RC1M added to monitoring program in spring 2002; habitat assessment performed at this site in fall 2002.
3/ Channel flow status observed during summer conditions.

Site WC2 is located on South Walnut Creek at site GS10 and upstream from the Pond B-1 Bypass. This site receives discharges from the Mound Plume ground water treatment system, which is situated upstream (west) of the North Access Road. This reach includes large deep pools (2.5-4.0 feet) at both the upstream and downstream ends, which are connected by a narrow riffle-run that flows though a dense stand of willows. Water was usually clear with moderate to heavy growths of filamentous algae in the pools. Substrates consisted mainly of silt, sand, gravel, and small to medium cobble. Banks were covered with tall grasses. This site is exposed as there are no trees in the immediate area.

Site WC3 is on South Walnut Creek between Ponds B-4 and B-5. Wastewater Treatment Plant effluent is discharged to Pond B-3, which is upstream from Pond B-4. Thus flows at this site are relatively stable and about 90% effluent-dominated (Fiehweg 2003). South Walnut Creek also receives discharge from the East Trenches Plume ground water treatment system that flows into Pond B-4. Water was typically green in color due to an abundance of planktonic algae from the upstream ponds and the fact that water is effluent-dominated. The channel is deeply incised (10-15 feet). Stream banks were very unstable and actively eroding. Banks are steep and vertical with exposed soils throughout most of the study reach. Alternating riffle, run, and pool sequences are common. Substrates were predominately clay with gravel and small to medium cobble mainly in riffle areas (Appendix B). Bank vegetative cover was diverse and included a good mix of grasses, forbs, shrubs, and trees. Numerous trees provided some shade over the stream channel.

Sites WC4 and WC5 are located on the mainstem of Walnut Creek. Site WC4 is located downstream from confluence of North and South Walnut Creeks, and downstream from No Name Gulch and Pond B-5. Site WC5 is near the eastern boundary of the Rocky Flats Site, upstream from GS03 and the Indiana Street Pond. Currently, discharge at these sites is largely dependent on periodic discharges from the terminal ponds (Ponds A-4 and B-5). These discharges are usually 2 to 4 c.f.s., and typically occur at 4 to 6-week intervals depending on the season and precipitation events (Stover 2002). Otherwise, the channel is dry during most of the year, except during storm events. When discharges occurred, riffle, run, and pool habitats were evident. Substrates at both sites were generally similar to those found at sites WC1 and WC2, consisting mainly of small to medium cobble, gravel, sand, and silt (Appendix B). Isolated pools remained at these sites for short durations (days to a few weeks) following the end of discharge events. However, such temporary hydrologic conditions are inadequate for the establishment of viable fish and macroinvertebrate populations, and currently, most of the biota collected at these sites are transients that have either washed in from upstream areas or have flown in from adjacent water bodies. Although there are some trees at these sites, the channel is mostly exposed. Grasses are predominant with

a variety of forbs and shrubs also present. Even though banks were grass covered, substantial erosion was evident at both sites, which is exacerbated by the periodic discharges.

RBP habitat assessment scores ranged from 130 to 153 for Walnut Creek sites (of a possible maximum score 200) for the fall 2001 and 2002 sampling events (Table 3). The highest habitat score was calculated for site WC1 (153). Scores were lower but similar at sites WC2 (130) and WC3 (130 and 132), while scores were 144 and 141 for site WC4, and 143 and 147 for site WC5 in 2001 and 2002, respectively. Note that the scores at sites WC4 and WC5 are for periods when the terminal pond discharges are occurring in an otherwise dry channel, which would result in a total score of 0 for most of the year. Scores for summer conditions were 147, 120, and 130 for sites WC1, WC2, and WC3, respectively, based on flow conditions observed at these sites during the summer season. Although summer scores were considerably less than fall scores for sites WC1 and WC2, habitat scores for site WC3 were the same for the fall and summer periods primarily because flows are consistent and seasonally stable.

There were no measurable habitat changes at sites WC1 and WC2 between the fall 2001 and 2002 assessments, thus habitat scores were the same. In downstream areas, bank stability (erosion) was the only habitat parameter that changed at sites WC3, WC4, and WC5 between the fall 2001 and 2002 assessments. More bank erosion, as evidenced by the dry and crumbling soils along the vertical stream banks, was measured at sites WC3 and WC4, which resulted in a decrease in the bank stability score and the total habitat score at these sites. While changes in bank stability were also measurable at site WC5 along the left and right stream banks, erosion was less evident at this site in the fall 2002; consequently, the total score at site WC5 improved slightly in 2002 (Table 3). Some eroded areas that were observed during the previous fall were now re-vegetated by grasses and had apparently stabilized during the 2002 growing season. Discharges from the terminal ponds were less frequent during the 2002 drought year with a 10% decrease in discharge quantity from 2001 levels (RFETS 2003). With the resulting lower flows at this site, the erosion of exposed soils was less and banks have had a chance to heal themselves. Although these same flow regimes occurred at site WC4 in 2002, similar improvements in bank stability were not observed because the banks are comparatively higher and more vertical than at site WC5.

3.1.2 Woman Creek

Flows in upper Woman Creek drainage (sites WO1 and WO2) are generally low and permanent with discharge sustained by ground water seeps. In addition, leakage from Rocky Flats Reservoir also provides some recharge to the watershed (Fiehweg 2003). Flow fluctuations are also influenced by

seasonal transpiration rates of riparian vegetation, which is greatest in the summer. Consequently, the lowest flows were observed at study sites during summer months, while flows increased notably in the fall in both 2001 and 2002 likely in response to decreased transpiration rates. While flows are permanent at sites WO1 and WO2, flows diminish considerably farther downstream in the vicinity of Pond C-2 to the extent that discharge was only evident at site WO3 in the fall 2001, and in the spring and fall 2002. Farther downstream, the channel was usually dry except on one occasion when only standing water was present in remnant pools at site WO4 near the Mower Ditch diversion.

Site WO1 on Woman Creek is located downstream from the confluence with Antelope Springs Creek, and upstream from Pond C-1. The stream flows through a grove of young cottonwood trees and an area of dense mature willows. Short riffle and pool sequences were common in the lower portion of the reach while the upper section is mostly riffle-run habitat. This reach is shallow with two larger pools (0.8 feet deep) and numerous small pocket pools created by cobbles and boulders. Substrates were predominantly cobble (mostly medium to large) interspersed with gravel and sand. Some small boulders were also present. Banks were stable and grass covered. Rushes and sedges were found both within and along the stream channel. Some filamentous algae growth was also present, but mostly in the summer.

Site WO2 is located approximately 250 feet downstream from Pond C1. The stream also flows through a grove of cottonwood trees at this site, which provides considerable shade in the upper portion of the reach, and then through a dense stand of mature willows farther downstream. Alternating riffle and pool habitats were predominant. Although the pools were fewer, they were comparatively larger and deeper (1.0-1.4 feet) than those found at site WO1, and the riffles were wider and longer. Cobble was also the dominant substrate with some gravel and sand. Deposits of fine organic sediment and iron precipitates were observed in the pools. Because the channel is somewhat shaded, periphyton and filamentous algae growth was only slight to moderate. Stream banks were generally stable and covered with grasses; however, some erosion was evident in the upper portion of the study reach.

Site WO3 is located in the Pond C-2 Bypass, near the toe of the dam. This reach includes a short section of riffle-run habitat with coarse sand and small gravel substrates. Several pools, some of which are fairly large and moderately deep (1.0-1.5 feet), were also present and often covered by mats of filamentous green algae when water was present. Pool substrates consisted mostly of sand and silt with some organic matter. Vegetation was generally scarce in this area and consisted mainly of grasses with a few willows and young cottonwood trees.

Site WO4 is downstream from Pond C-2 and confluence with Mower Ditch. The lack of water at this site during the 2001-2002 study period precluded conducting any level of habitat assessment. An assessment will be performed in the future when sufficient flows are available to warrant such an effort.

RBP habitat assessment scores for the two upper sites on Woman Creek were similar between sites and seasons (Table 4). Total scores were 157 and 158 for sites WO1 and WO2, respectively, and 147 and 148 for summer flow conditions. There were no changes in any of the habitat parameters measured between the fall 2001 and 2002 assessments. Although total scores were similar at the two sites, there were some habitat parameter differences (pool variability and bank stability). There is permanent water at sites WO1 and WO2 throughout the year, but flows are generally low and seasonally intermittent in the drainage, and habitat quality decreases primarily due to diminishing flows during the summer months.

3.1.3 Rock Creek

Sites RC1 is located on the North Fork of the Middle Fork of Rock Creek. Aquatic habitat is largely sustained by numerous permanent ground water seeps. This site is situated immediately downstream from a cattail marsh where flows first emerge to form a discernible channel. Flows were always very low but seasonally stable during all sampling events. The stream flows into two small shallow pools, through a dense stand of cattails, and into an open grassy meadow area. The substrate was mainly medium to large cobble over a firm mud/clay bottom that was often covered by iron precipitates and heavy growths of filamentous and periphytic algae. Duckweed was also abundant. Stream banks were well vegetated with a good diversity of grasses, sedges, and other wetland plants. A diverse mix of woody shrubs (such as willow, wild plum, common choke cherry, indigobush, and others) and a few trees are common throughout the Middle Fork drainage. Because of the wetland character and stable perennial flows, aquatic habitat at site RC1 is the most diverse of all sites in of Rock Creek as well as in the other drainages.

Site RC1M is also on the North Fork of the Middle Fork, upstream from the confluence with the mainstem of Rock Creek (Figure 1). This site was added to the monitoring program in the spring 2002. While flow is also permanent at this site and sustained by ground water seeps, discharge was seasonally more variable than observed at site RC1. This study reach includes numerous riffle and pool sequences. Four of the five pools were relatively large and deep (0.9-2.0 feet) for a stream of this size. Gravel and small to medium cobble were the predominant substrates with some sand and fine organic sediment in the pools. The cobble was covered by periphytic algae and iron precipitates. Duckweed and watercress were

also abundant in both pool and riffle habitats. Stream banks were mostly grass covered although some erosion was noted in areas where the stream is confined by the hillside. This site also had a good diversity of woody shrubs as found at site RC1 with several trees also present.

Site RC2 is on the mainstem of Rock Creek, downstream from Lindsey Pond. This site is distinctly different from sites RC1 and RC1M in that the stream flows through an open meadow area and dense stands of cattails (Appendix A). Although some shrubs were present, there was only one willow tree at the top of the reach. The study reach included five pools that were moderate in size but rather deep (1.1-2.6 feet) with overhanging grasses with a soft muddy bottom laden with organic detritus. A narrow shallow riffle-run channel connected the pools. Gravel and small to medium cobble overlaid the firm mud/clay bottom in riffle-run segments. Prolific growths of filamentous algae, duckweed, and watercress were usually present. Flow was observed at this site on all sampling occasions, except during the drought summer 2002 when the channel was dry and only standing water remained in two of the pools at this site.

Site RC3 is located on the mainstem of Rock Creek upstream from the confluence with the North and South Forks. Discharge was present on most sampling events, except in the drought summer of 2002. In summer months, the stream disappears in places and then resurfaces, illustrating the intermittent nature of Rock Creek in the downstream reaches. The stream meanders though a small grove of cottonwoods and mature willows with a good diversity of alternating riffle, run, and pool habitats. Pools were numerous and moderate to large in size and were relatively deep (0.6-1.7 feet) with overhanging grasses. Substrates were mostly cobble interspersed with gravel and sand with deposits of organic sediment in the pools. Filamentous and periphytic algae and some watercress were also found in the pools, although growth was usually not as heavy as observed at the other Rock Creek sites. Stream banks were stable and well vegetated with a diverse mix of grasses, forbs, shrubs, and trees.

RBP habitat assessment scores varied widely for sites on Rock Creek (Table 5). Site RC1 had the lowest habitat score mainly because of the obvious lack of cover and pool habitat (for aquatic life), but had the least seasonal flow variation of all the Rock Creek sites because of ground water seeps in the upper drainage. Flow conditions are somewhat similar throughout the year at site RC1 and to a lesser extent at site RC1M due to ground water seeps in upper Rock Creek drainage. However, these seeps diminish in a downstream direction and the creek becomes more intermittent at sites RC2 and RC3.

Total habitat scores were similar for site RC1 for fall and summer conditions (133 and 131). Habitat scores were 163, 152, and 171 for sites RC1M, RC2, and RC3, respectively. Scores were comparatively

lower for these sites during summer flow conditions (152, 135, and 153) with the greatest score differences observed at sites RC2 and RC3 due to the lack of water. Only standing water was present in two pools at site RC2, and site RC3 was completely dry in the drought summer 2002. The lack of water during summer months is the most limiting factor affecting habitat quality and adversely affects the establishment of fish and macroinvertebrate populations in Rock Creek.

3.1.4 Summary of Habitat Assessment Results

Habitat scores were generally highest in the Rock Creek drainage with scores comparable to those for sites WO1 and WO2 in Woman Creek, and site WC1 in upper Walnut Creek (Tables 3, 4, and 5). Overall, the lowest scores were recorded for sites WC2, WC3, WC4, and WC5 in Walnut Creek and for RC1 in the upper reaches of Rock Creek. The lower scores in Walnut Creek reflect the generally poor condition of stream banks, which is further aggravated at sites WC4 and WC5 by the periodic discharges from the terminal ponds. The low score at RC1 was mainly due to the lack of cover and pool habitat.

The lower scores recorded for the four downstream sites in Walnut Creek and the upper site in Rock Creek ranged between 130 and 147 during the 2001-2002 study period. Habitat assessment scores were also similar (124 to 136) to those reported for the Big Dry Creek monitoring program conducted in 2000 and 2001, which included sites in lower Walnut Creek and upper Big Dry Creek near the confluence of Walnut Creek (Aquatics Associates, Inc. 2002).

An earlier habitat assessment study was conducted at numerous sites in Walnut and Woman Creeks at Rocky Flats and in upper Big Dry Creek between November 1994 and January 1995. Although the older EPA methodology was used (Plafkin et al. 1989) in this effort, the same general trends in scores were evident for the Walnut Creek drainage with the highest score reported for a site on North Walnut Creek (near WC1), while scores were comparatively lower for several sites on South Walnut Creek (near WC3) and the mainstem downstream to the Indiana Street Pond (near WC4 and WC5) (Wright Water Engineers, Inc. 1995). Similarly, high scores were reported for sites in the Woman Creek drainage, which were in proximity to sites WO1, WO2, and WO3. This study did not include an assessment of habitat in the Rock Creek drainage.

3.2 FISH POPULATIONS

Fish populations were sampled at nine of the study sites in Walnut, Woman, and Rock Creeks in August 2001 (Table 2). Fish were present at seven of the nine sites as described below. Follow-up surveys were conducted at sites WC4 and WC5 in October 2001, to further verify fish abundance during more suitable sampling conditions since only few specimens were collected initially. Insufficient flows precluded sampling at sites RC1, WO3, and WO4. No sampling was performed during the 2002 drought year as fish populations were adequately documented with the 2001 effort. However, future sampling is planned for 2003 to determine the stability of fish communities in streams at the Rocky Flats Site considering the 2002 drought. Subsequent efforts will include sampling at site RC1M, which was added to the monitoring program in spring 2002 and has not yet been sampled.

Fish were collected at only seven of the nine study sites during the 2001 monitoring period as listed in Table 6. Fish population data presented for these sites include the number of fish collected, mean lengths and weights, and the number of age classes for representative species. Naturally self-sustaining fish populations were found at only four sites, namely WC3, WO1, WO2, and RC2. A viable population of fathead minnows was found at site WC3 on Walnut Creek and at site RC2 on Rock Creek (below Lindsey Pond). A total of 298 fathead minnows (*Pimephales promelas*) were collected at site WC3, while 185 fatheads were collected at site RC2. Both juvenile and adult fish were collected at these sites. In Woman Creek, a stable and healthy creek chub (*Semotilus atromaculatus*) population was found at both sites WO1 and WO2, which included 3 and 4 consecutive age classes, respectively. One longnose dace (*Rhinichthys cataractae*) was also collected at site WO1.

In August, no fish were collected at sites WC1, WC2, or WC4, and only one fathead minnow each was collected at sites WC5 and RC3. Sites WC4 and WC5 were re-sampled in October to better document the population and the potential effects of periodic discharges in the lower reaches of Walnut Creek. No additional fish were collected at site WC5 in October. No fathead minnows were collected from pools that remained at site WC4 after the October discharge event. The fact that only one or two fathead minnow specimens were collected at sites WC4, WC5, and RC3 suggests that these fish have likely washed into to these locations from upstream areas (where viable populations exist) during periods of increased discharges.

TABLE 6

FISH POPULATION SAMPLING RESULTS FOR SITES IN WALNUT, WOMAN, AND ROCK CREEKS AT ROCKY FLATS, 2001

Site	Fish Species	Number Collected	Mean Length (mm	Mean Weight (g)	Number of Age Classes
WALNUT CREEK 1/					
WC3	Fathead Minnow	298	27 (24-73)	0.2 (0.1-6)	2
WC4	Fathead Minnow	2	58 (46, 69)	2.5 (1.5, 3.5)	1
WC5	Fathead Minnow	1	52	2	1
WOMAN CREEK 2/					
WO1	Creek Chub	11	81 (35-120)	7 (0.5-17)	3
	Longnose Dace	1	72	3	1
WO2	Creek Chub	46	98 (26-219)	18 (0.5-94)	4
ROCK CREEK 2/					
RC2	Fathead Minnow	185	63 (40-81)	3 (0.8-5.5)	2
RC3	Fathead Minnow	1	50	1.5	1

1/ No fish were collected at sites WC1 or WC2.
2/ Sampling not performed at sites WO3, WO4, and RC1 due to insufficient flows.

The longnose dace, creek chub, and fathead minnow are all native species in the South Platte River Basin and are common in cool water transition zone streams with low siltation (Nessler et al. 1997). Longnose dace is the only intolerant species (Barbour et al. 1999). The fathead minnow is a silt tolerant species and is fairly ubiquitous throughout the South Platte River and tributaries. The three species that were collected at Rocky Flats in 2001 were also common at sites in lower Walnut Creek and upper Big Dry Creek near the confluence of Walnut Creek, which were sampled as part of the Big Dry Creek monitoring program (Aquatics Associates, Inc. 2002).

In an earlier fish survey conducted at Rocky Flats during the summer of 1991, which did not include Rock Creek, fathead minnows were also the only species collected from various sites in the Walnut Creek drainage (U.S. Department of Energy 1992). In Woman Creek, creek chubs were also collected during the 1991 study, along with six other species including central stoneroller (*Campostoma anomalum*), fathead minnow, golden shiner (*Notemigonus crysoleucas*), white sucker (*Catostomus commersoni*), green sunfish (*Lepomis cyanellus*), and largemouth bass (*Micropterus salmoides*). However, no longnose dace were collected. The fact that this study included more sites (nine vs. two) than the 2001 study may in part explain why more species were collected. Nonetheless, all of these species were recently found at the various sites sampled for the Big Dry Creek monitoring program (Aquatics Associates, Inc. 2002). Future monitoring will further document species abundance and distribution as well as fish population stability in drainages at the Rocky Flats Site.

3.3 MACROINVERTEBRATES

The macroinvertebrate community was sampled in the streams environments of Walnut, Woman, and Rock Creeks at the Rocky Flats Site (Figure 1 and Table 1). Macroinvertebrate samples were collected on five occasions on a seasonal basis from the summer 2001 to fall 2002. The percent relative abundance for important and/or predominant species collected in the three drainages are provided in Tables 7, 8, and 9 for Walnut, Woman and Rock Creeks, respectively. A complete species list is presented in Appendix C that includes the occurrence of individual taxa collected at each site during the 2001-2002 sampling period. Trends in number of taxa and density for all sites and seasons are provided in Figure 2, while percent relative abundance is shown in Figure 3. Species diversity and Hilsenhoff Biotic Index (HBI) values are depicted in Figure 4. Invertebrate Community Index (ICI) scores are shown in Figure 5. Summaries of total density, percent relative abundance of taxonomic groups, and important community parameters, as well as the detailed data (list of species, relative abundance, total density, number of taxa, and other community parameters for each site and sampling event) are provided in Appendices D and E for 2001 and 2002, respectively.

Overall, the macroinvertebrate community was very diverse and abundant with most species being tolerant of the extreme environmental conditions that are characteristic of transitional foothills-plains streams environments. The perennial, intermittent, or flow interrupted nature of the stream environments encountered provides a diversity of aquatic habitats such as both shallow lotic and lentic conditions, remnant pools, spring seeps, and wetland areas within the stream channel, all of which support a correspondingly diverse macroinvertebrate fauna. Flow conditions at most sites are perennial or seasonally intermittent, but are presently effluent-dominated at site WC3 and discharge-dependent at sites WC4 and WC5 in Walnut Creek. Seasonal taxa richness was lowest in the summer of 2002 with 95 taxa, which was likely related to the record drought conditions, and was highest in summer 2001 when 140 taxa were collected (Appendix C).

Total densities varied widely among sites and seasons, which is typical of macroinvertebrate communities of flow limited streams, especially considering the potential for significant flow fluctuations during localized storm events in these drainages. Total densities ranged from 36,038 organisms per square meter (organisms/m^2) at site RC3 in the fall 2002, to only 189 organisms/m^2 at site WO3 also in the fall 2002 (Figure 2, Appendices D and E). The predominant macroinvertebrate group collected in all three drainages during the sampling period was Diptera (true flies). Dipteran mean percent relative abundance

TABLE 7

MEAN PERCENT RELATIVE ABUNDANCE FOR PREDOMINANT AND IMPORTANT MACROINVERTEBRATE SPECIES COLLECTED IN WALNUT CREEK FOR SEASONS AND SITES SAMPLED, 2001 AND 2002

	Seasonal Means					Site Means				
	2001		2002							
Taxa	Summer	Fall	Spring	Summer	Fall	WC1	WC2	WC3	WC4	WC5
OLIGOCHAETA (aquatic worms)										
Enchytraeidae	0.3	5.0	0.1	0.1	0.5	0.3	<0.1	<0.1	5.5	3.6
Tubificidae	12.4	3.8	0.8	1.1	8.3	6.7	1.2	0.3	5.3	23.8
AMPHIPODA (scuds)										
Hyalella azteca	23.2	8.3	6.4	33.5	9.5	21.3	26.2	17.4	nc *	0.3
EPHEMEROPTERA (mayflies)										
Baetis tricaudatus	5.0	8.5	1.4	9.7	4.3	0.5	nc	23.8	<0.1	nc
Callibaetis sp.	1.8	4.1	0.2	1.7	0.9	0.4	5.8	0.3	1.6	0.8
ODONATA (dragonflies and damselflies)										
Argia sp.	2.1	2.4	3.5	1.0	1.0	6.7	0.9	0.6	nc	nc
HEMIPTERA (true water bugs)										
Trichocorixa borealis	0.2	0.3	nc	nc	38.1	nc	nc	nc	33.3	31.0
TRICHOPTERA (caddisflies)										
Cheumatopsyche sp.	3.2	3.5	0.3	4.2	1.4	nc	nc	10.8	<0.1	nc
Limnephilus sp.	nc	3.0	0.4	nc	0.7	1.9	0.7	0.1	2.0	0.1
DIPTERA (true flies)										
Chironomidae (midges)										
Chironomus sp.	11.0	0.7	9.8	0.3	0.1	0.4	6.1	0.2	18.2	0.5
Cricotopus sp.	5.3	0.3	5.2	1.5	0.3	0.1	2.0	6.7	1.2	0.6
Dicrotendipes sp.	3.1	0.2	0.6	2.5	0.2	nc	5.0	0.2	0.2	0.1
Micropsectra sp.	2.1	1.1	16.6	16.7	0.7	10.8	10.2	1.0	2.7	0.5
Nilotanypus sp.	0.5	nc	8.6	0.3	nc	5.8	<0.1	nc	nc	nc
Paratendipes sp.	0.3	3.7	1.6	4.4	1.3	5.9	2.8	0.1	nc	0.1
Radotanypus sp.	0.2	1.9	0.5	3.8	0.8	4.9	0.4	nc	nc	0.3
Thienemannimyia group	0.4	1.9	9.6	0.2	0.3	7.4	0.8	0.3	nc	<0.1
Simulidae (black flies)										
Simulium vitattum complex	5.5	1.1	20.9	0.6	7.1	3.3	0.6	21.2	2.3	0.4
GASTROPODA (snails)										
Physa sp.	3.9	22.2	0.4	3.6	11.1	3.6	19.8	0.4	11.1	15.5

* nc indicates species not collected.

TABLE 8

MEAN PERCENT RELATIVE ABUNDANCE FOR PREDOMINANT AND IMPORTANT MACROINVERTEBRATE SPECIES COLLECTED IN WOMAN CREEK FOR SEASONS AND SITES SAMPLED, 2001 AND 2002

	Seasonal Means					Site Means		
	2001		2002					
Taxa	Summer	Fall	Spring	Summer	Fall	WO1	WO2	WO3
OLIGOCHAETA (aquatic worms)								
Aulodrilus pigueti	2.8	nc *	nc	17.7	14.6	nc	16.9	nc
Enchytraeidae	nc	0.5	0.1	nc	13.3	0.2	nc	13.6
Nais communis	4.1	12.3	4.5	2.1	8.2	8.6	8.7	0.4
Tubificidae	18.5	23.1	2.3	41.8	23.3	24.5	6.0	38.1
AMPHIPODA (scuds)								
Hyalella azteca	28.4	6.5	0.6	17.9	0.2	3.6	19.3	nc
EPHEMEROPTERA (mayflies)								
Caenis bajaensis	6.1	13.3	11.5	nc	0.1	14.2	3.1	nc
DIPTERA (true flies)								
Chironomidae (midges)								
Chironomus sp.	0.1	1.0	1.2	3.5	1.9	nc	3.2	1.2
Micropsectra sp.	1.0	3.1	7.4	nc	5.4	4.8	0.7	7.4
Odontomesa sp.	nc	nc	20.9	nc	nc	9.0	3.4	0.1
Rheocricotopus sp.	nc	1.8	nc	nc	9.5	0.6	6.1	nc
Tanytarsus sp.	0.0	0.7	6.0	1.9	nc	0.4	4.4	nc
Simulidae (black flies)								
Simulium vitattum complex	0.1	3.2	12.5	nc	0.7	0.9	1.9	11.6
GASTROPODA (snails)								
Physa sp.	6.8	1.5	0.1	1.0	4.5	4.7	2.1	nc

* nc indicates species not collected.

TABLE 9

MEAN PERCENT RELATIVE ABUNDANCE FOR PREDOMINANT AND IMPORTANT MACROINVERTEBRATE SPECIES COLLECTED IN ROCK CREEK FOR SEASONS AND SITES SAMPLED, 2001 AND 2002

	Seasonal Means					Site Means			
	2001		2002						
Taxa	Summer	Fall	Spring	Summer	Fall	RC1	RC1M	RC2	RC3
TURBELLARIA (flatworms)									
Dugesia sp.	0.8	3.4	0.6	8.1	4.3	3.3	10.6	1.6	0.1
OLIGOCHAETA (aquatic worms)									
Nais communis	0.8	2.3	1.1	0.2	6.7	0.6	3.4	4.1	1.8
Tubificidae	13.8	6.9	15.1	31.3	13.5	16.9	13.0	25.9	4.3
AMPHIPODA (scuds)									
Hyalella azteca	16.4	6.3	3.6	32.4	6.1	18.0	20.0	10.6	0.2
EPHEMEROPTERA (mayflies)									
Caenis bajaensis	2.8	5.2	10.5	0.3	6.5	2.2	14.5	7.7	<0.1
Callibaetis sp.	0.2	1.3	0.1	nc	4.4	nc	0.1	2.5	2.4
Fallceon quilleri	2.8	8.3	2.9	1.6	2.9	4.9	2.4	5.7	0.1
PLECOPTERA (stoneflies)									
Capnura wanica	nc *	9.7	nc	nc	1.3	nc	nc	nc	8.6
DIPTERA (true flies)									
Ceratopogonidae (biting midges)	0.3	0.6	5.8	0.1	0.5	3.6	1.7	0.9	0.1
Chironomidae (midges)									
Chironomus sp.	0.2	0.3	nc	0.1	5.5	nc	0.2	2.4	2.9
Cricotopus sp.	nc	0.5	4.7	nc	1.8	0.1	3.7	1.0	2.8
Micropsectra sp.	2.3	9.0	0.5	nc	8.7	1.0	0.5	2.1	13.4
Nilotanypus sp.	1.0	nc	3.7	2.5	nc	2.5	3.7	0.2	<0.1
Tanytarsus sp.	nc	0.7	9.3	0.4	1.7	5.3	4.1	0.9	1.0
Simulidae (black flies)									
Simulium vitattum complex	5.8	12.4	1.4	nc	3.7	4.5	1.6	7.3	2.7
GASTROPODA (snails)									
Physa sp.	14.7	13.0	0.5	1.3	1.9	11.2	1.2	0.6	8.6
BIVALVIA (fingernail clams)									
Pisidium sp.	0.3	0.7	0.7	6.8	3.4	5.7	3.3	0.3	nc

* nc indicates species not collected.

FIGURE 2

DENSITY AND TOTAL NUMBER OF TAXA COLLECTED AT SITES IN WALNUT, WOMAN, AND ROCK CREEKS AT ROCKY FLATS, 2001 AND 2002

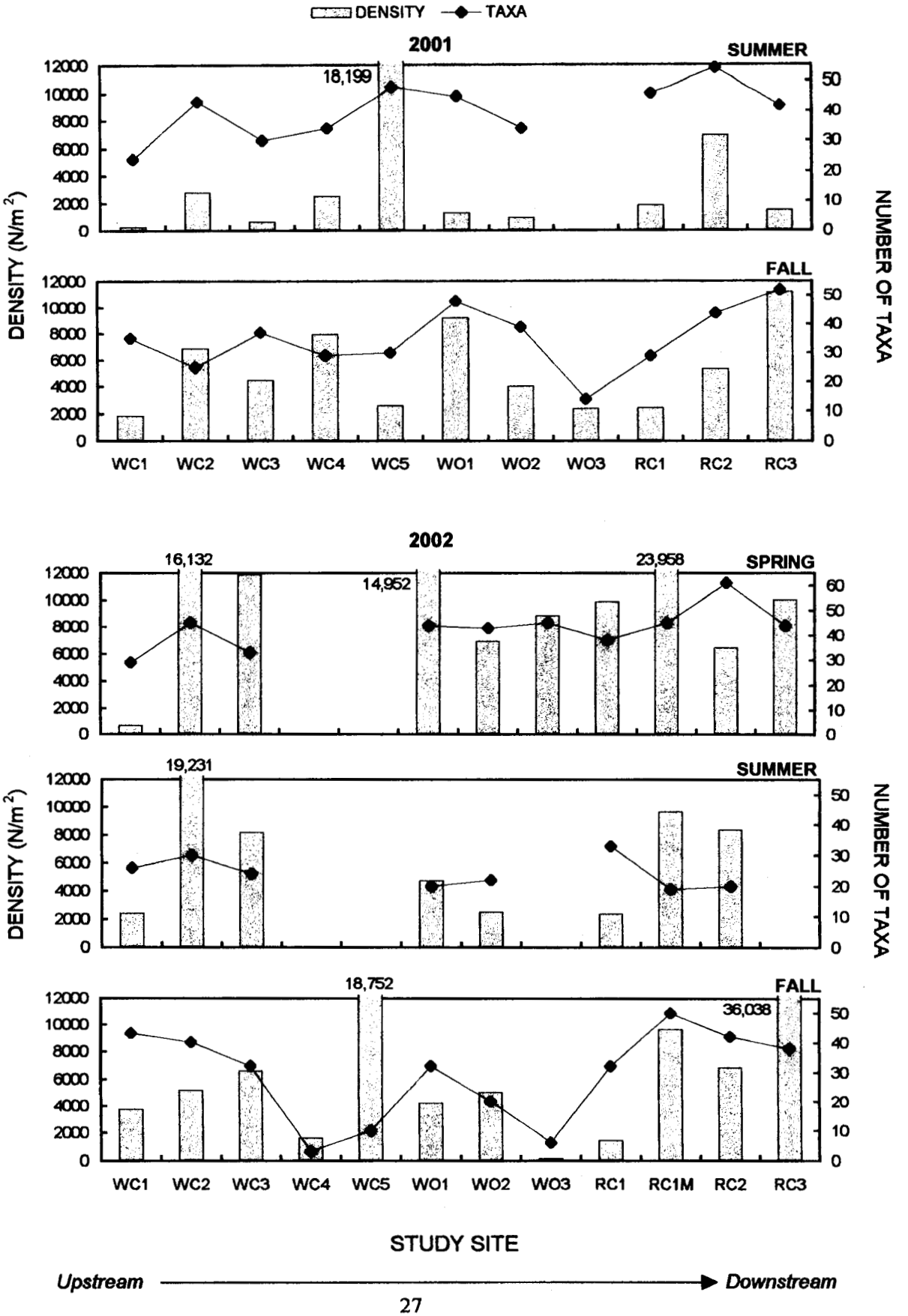


FIGURE 3

PERCENT RELATIVE ABUNDANCE OF MACROINVERTEBRATE TAXONOMIC GROUPS COLLECTED AT SITES IN WALNUT, WOMAN, AND ROCK CREEKS AT ROCKY FLATS, 2001 AND 2002

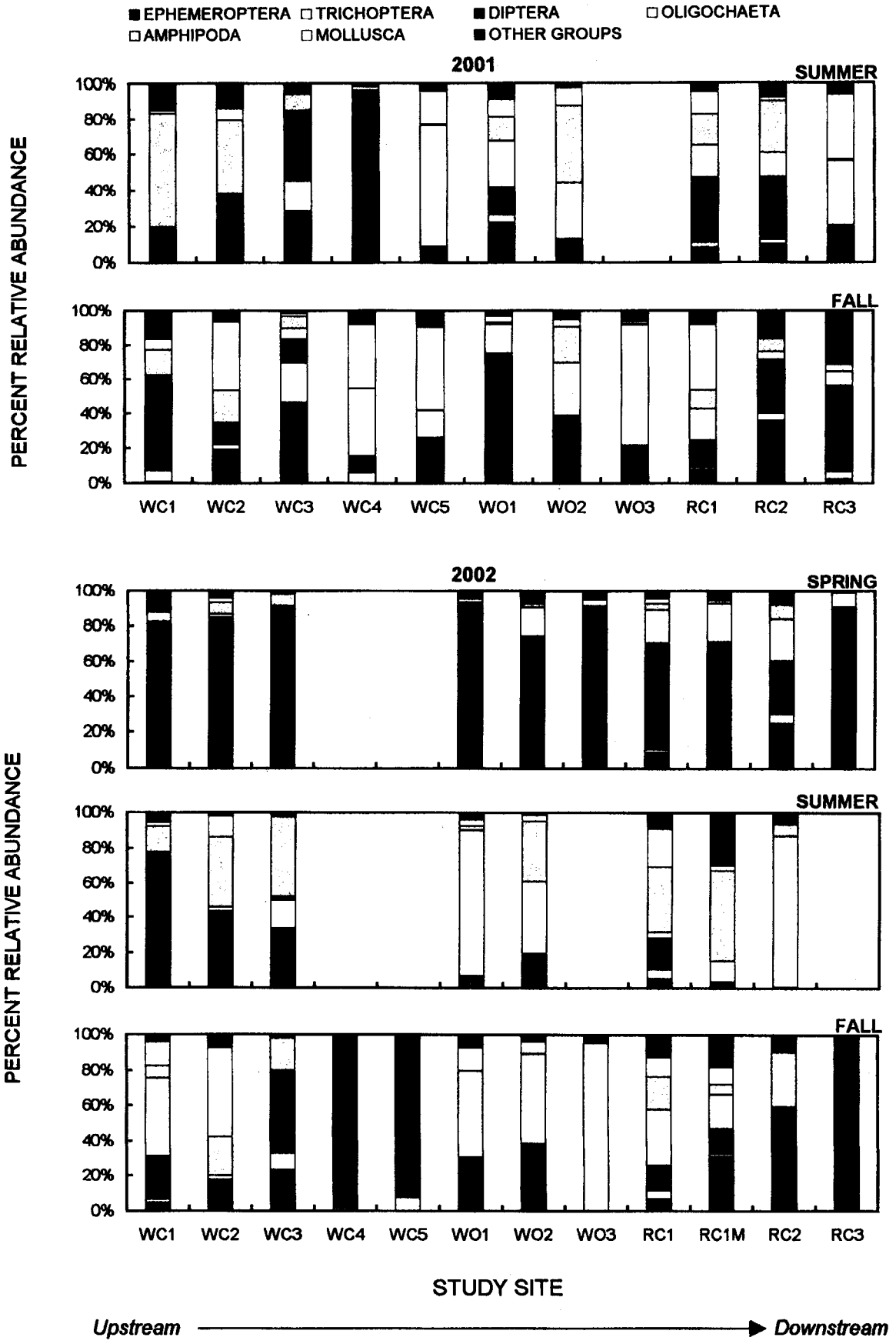


FIGURE 4

HILSENHOFF BIOTIC INDEX (HBI) AND SPECIES DIVERSITY VALUES FOR STUDY SITES IN WALNUT, WOMAN, AND ROCK CREEKS, 2001 AND 2002

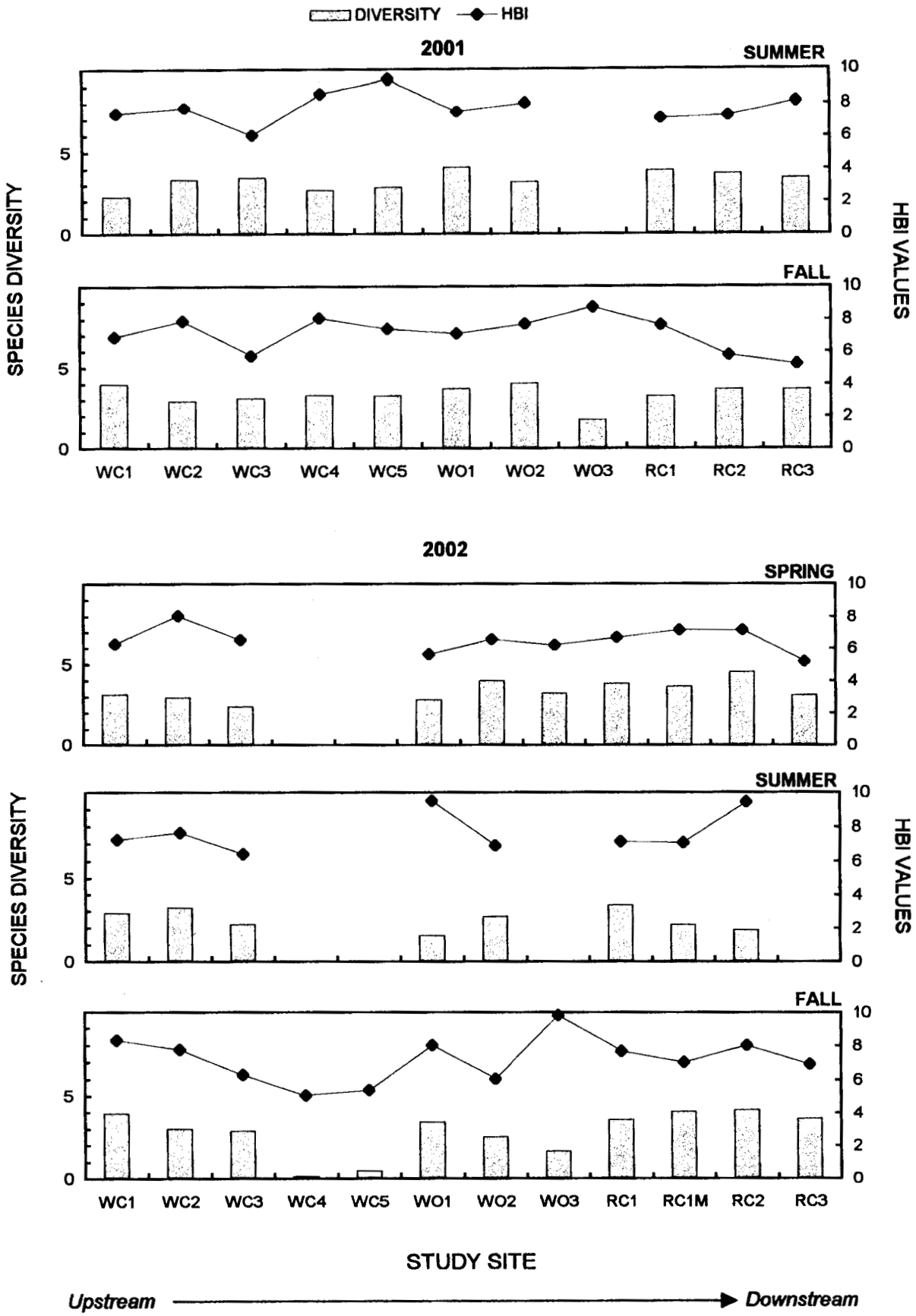
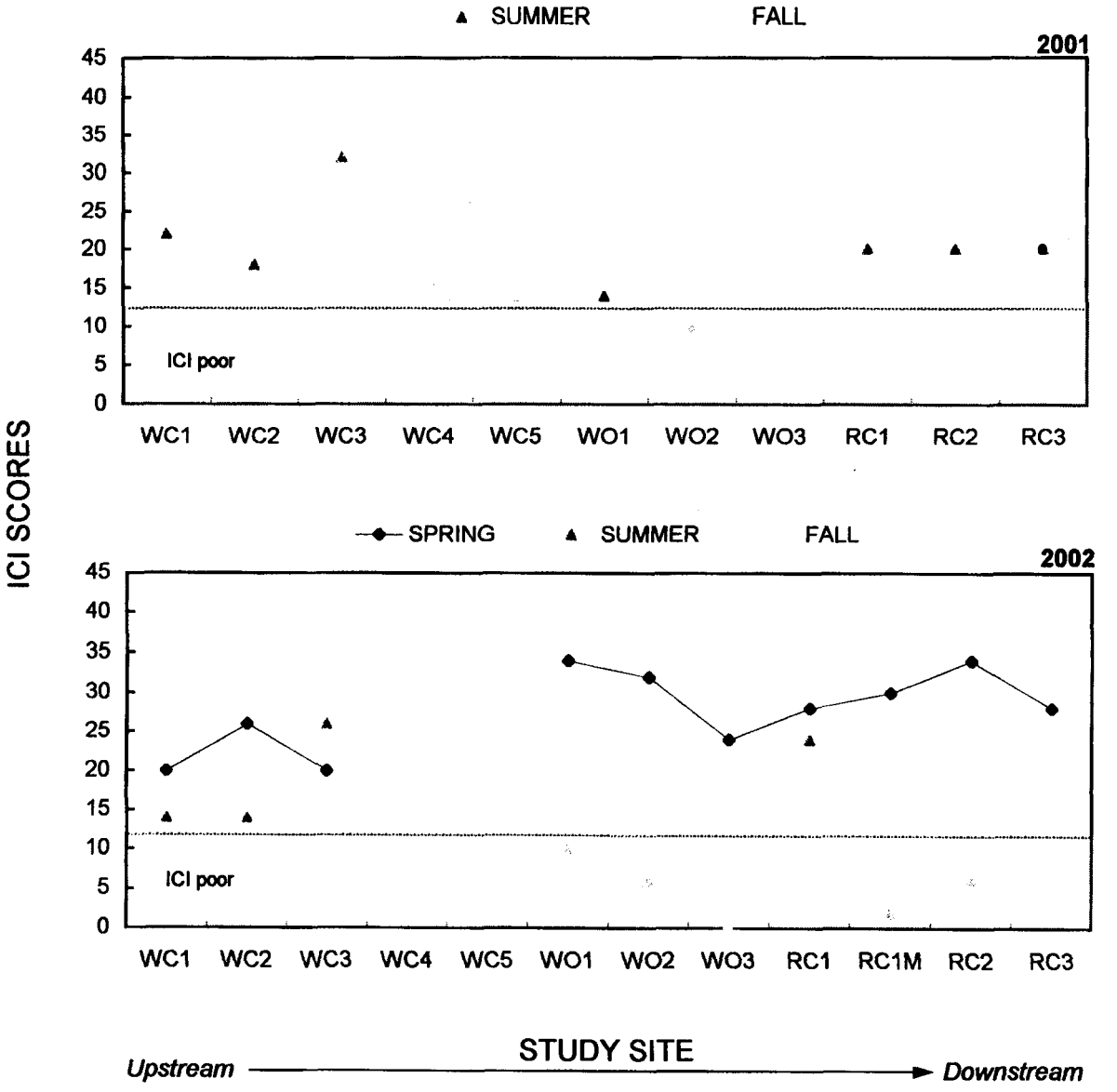


FIGURE 5

INVERTEBRATE COMMUNITY INDEX (ICI) SCORES FOR STUDY SITES IN WALNUT, WOMAN, AND ROCK CREEKS, 2001 AND 2002



for all sampling events and sites was 34.3% with the highest mean abundance recorded in spring 2002 at 69.5% and the lowest in the summer 2002 at 19.3%. Dipteran mean percent relative abundance in Woman and Rock Creeks was nearly equal at 29.7 and 33.2%, respectively; while in Walnut Creek the mean was 39.9%. Of the dipterans collected the vast majority were of the family Chironomidae (midges). Chironomid taxa comprised between 62.0 and 74.2% of the dipteran taxa collected for the five sampling events. Oligochaeta (aquatic worms), Amphipoda (scuds), Mollusca (snails and fingernail clams), and Ephemeroptera (mayflies) were also generally abundant at most sites and seasons. Notably scarce in these drainages were significant numbers and taxa of Odonata (dragonflies and damselflies), Hemiptera (true water bugs), and Trichoptera (caddisflies). Specific characteristics of the macroinvertebrate community found in each drainage are discussed below.

3.3.1 Walnut Creek

The macroinvertebrate community in Walnut Creek was similar to the other streams at Rocky Flats and was dominated by dipterans, especially chironomids (Figure 3, Appendices D and E). During the sampling period, Diptera comprised an average of 39.9% of the macroinvertebrate community and ranged from 17.2% in fall 2002 to 83.2% in spring 2002. The most abundant dipterans were the chironomids *Chironomus* sp., *Cricotopus* sp., and *Micropsectra* sp. (Table 7). Both *Chironomus* sp. and *Micropsectra* sp. are collector-gatherers, whereas *Cricotopus* sp. is primarily a shredder. The filter feeding black flies, *Simulium vittatum* complex were also relatively abundant, especially at site WC3, which receives effluent-dominated flows throughout the year. These are all common and ubiquitous species in Colorado Front Range streams. These species have tolerance values ranging between 6 and 10, indicating their moderate to high tolerance of organic pollution and general hardiness (Barbour et al. 1999).

The second most abundant macroinvertebrates in Walnut Creek were the non-insect group Amphipoda (scuds or freshwater shrimp), all of which were *Hyalella azteca*. This species is common in slow moving or standing water environments, is widespread, and has a broad tolerance (value of 8) to a number of environmental variables (Smith 2001). Overall, their mean percent abundance was 16.2% of the macroinvertebrate community in Walnut Creek with the highest abundances observed during the summer seasons when their reproductive activity is greatest (Table 7). Over the sampling period, *Hyalella azteca* was most abundant at sites WC1, WC2, and WC3 with mean abundances of 17.4 to 26.2%, although they were absent at site WC4 and sparse at site WC5.

Mayflies were relatively abundant in Walnut Creek with an overall mean abundance of 8.5% during the study period. While mayflies were always present and most abundant at site WC3 (23.5 to 46.6%RA on four of five occasions), they were occasionally either absent or present at <1%RA at the other sites (Figure 3). *Baetis tricaudatus* and *Callibaetis* sp. were the predominant mayflies in Walnut Creek (Table 7). *Baetis tricaudatus* was found almost exclusively at site WC3 (23.8%RA), whereas *Callibaetis* sp. was collected at all sites, but was most abundant at site WC2 (5.8%RA). *Baetis tricaudatus* is moderately tolerant of organic pollution (value of 5), whereas *Callibaetis* sp. is rather tolerant (value of 9). All mayflies collected were collector-gatherers indicating the availability of detritus as a food source for these organisms.

Oligochaetes were present at most all sites during the study period with an overall mean abundance of 8.1% and were found sporadically in high numbers at sites WC1 (44.0%RA in fall 2002), WC4 (39.3%RA in fall 2001), and WC5 (67.7, 15.5, and 7.4%RA in summer 2001, fall 2001, and fall 2002, respectively). Tubificid worms were the most abundant taxa except on one occasion when enchytraeids were more abundant (Table 7). Overall, tubificids were most abundant at site WC5 with a mean abundance of 23.8% and to a lesser extent at sites WC1 and WC4. Pools with soft fine sediment substrates are the preferred habitats of these organisms. Although the channel is often dry at sites WC4 and WC5 when periodic discharges from the terminal ponds are not occurring, these organisms can form cysts allowing them to survive desiccation or periodically moist conditions for short durations (Kaster and Bushnell 1981). These organisms may also wash downstream into these sites from the terminal ponds. Tubificids and enchytraeids are pollution tolerant (value of 10).

Odonata (dragonflies and damselflies) were most often collected at sites WC1 and WC2 in pool habitats where mean abundances were 7.6 and 4.7%RA, respectively. The overall mean abundance was 3.2% for all Walnut Creek sites. The damselfly, *Argia* sp. was the predominant species, which was most numerous at site WC1 with a mean abundance of 6.7% (Table 7). This species is moderately tolerant (value of 7).

Caddisflies were found almost exclusively at site WC3 where the filter-feeding *Cheumatopsyche* sp. was predominant and averaged 10.8%RA for the sampling period (Table 7). The consistent effluent-dominated flows at this site undoubtedly favor colonization by this species. *Limnephilus* sp. on the other hand was collected at all sites, but represented only 2.0%RA or less of the community. Limnephilids are shredders and are less dependent on flowing water than the *Cheumatopsyche* sp., thus they were more widespread within the drainage.

Sites WC4 and WC5 were the only sites in Walnut Creek (and the other two drainages) where Hemiptera (true water bugs) were collected in significant numbers. This group was dominated by the adult water boatman *Trichocorixa borealis,* which was very abundant in the fall 2002 with overwhelming abundances of 98.3 and 92.4% at sites WC4 and WC5, respectively (1,628 and 17,328 organisms/m^2). Although the channel was completely dry prior to the discharge event in October 2002, adults of this ubiquitous species rapidly colonized the remnant pools found at these sites shortly after cessation of pond discharges.

Gastropods comprised an average of 9.6% of the macroinvertebrate population in Walnut Creek during the sampling period. Gastropods were most abundant at sites WC2, WC4, and WC5 in fall 2001, and at WC2 in fall 2002, accounting for 33.2 to 45.7%RA on these occasions. The common and tolerant species, *Physa* sp. was by far the dominant taxon (Table 7). The mean abundance of *Physa* sp. was highest in fall 2001 when it comprised 22.2% of the total community. *Physa* sp. was generally most abundant at site WC2 with a mean abundance of 19.8%.

Total densities in Walnut Creek were similar to most flow limited intermittent streams showing wide temporal and spatial variations (Figure 2). Densities ranged from to 264 to 19,231 organisms/m^2 at sites WC1 and WC2 in the summer of 2001 and 2002, respectively. At site WC3 where flows are effluent-dominated, seasonal densities ranged from 674 organisms/m^2 (summer 2001) to 11,886 organisms/m^2 (spring 2002). The overall mean density for all sites and sampling events was 7,097 organisms/m^2 (range 1,807-13,187 organisms/m^2). Species richness ranged from 24 to 48 taxa, except at sites WC4 and WC5 in 2002 when only 3 and 10 taxa were collected in the fall, and in the spring and summer when no samples were collected at these sites because the channel was dry. Considering all sites and seasons, the fewest number of taxa collected was 55 during the drought summer of 2002, whereas the most taxa (96) were collected in summer 2001.

Species diversity values for all sites were moderately high and ranged from 2.23 at site WC3 in summer 2002, to 3.98 at site WC1 in fall 2001, when the very low diversity values for sites WC4 and WC5 in the fall 2002 are ignored (0.13 and 0.48, respectively) (Figure 4). These low values resulted due to the overwhelming numbers of trichocorixids at these two sites. Overall, species diversity values were moderately high with a mean diversity of 2.69 for all sites, and 3.06 for sites WC1, WC2, WC3. These values indicate that the Walnut Creek macroinvertebrate community includes a moderately diverse assemblage of organisms although the majority of the taxa are moderate to highly tolerant of environmental stresses.

Furthermore, the elevated HBI values and the low ICI scores also indicate the community is dominated by moderate to highly tolerant organisms (Figures 4 and 5, respectively). HBI values ranged from 5.07 to 9.45 (HBI values approaching 10 indicate a higher degree of community tolerance). ICI scores also indicate a moderately stressed macroinvertebrate community; however, none of the scores for Walnut Creek were rated as *poor* (Figure 5). Of the 21 sampling events, 20 had scores ranging from 14 to 34, which were in the *fair* category (13 to 35), and on one occasion the score was in the *good* category (38 at site WC3 in fall 2001). Overall, the mean ICI score was 19.4 for the Walnut Creek drainage, and mean ICI scores ranged from 14.0 to 29.6 for individual sites. The highest mean score was at site WC3 where stream flows are stable and consistently higher than at the upper two sites. Of all the sites, flows are probably most suitable at site WC3, providing the most favorable conditions for aquatic life. In contrast, sites WC4 and WC5 had the lowest mean ICI scores at 16.0 and 14.0, respectively, likely due to the interrupted flow regime, which prevents the establishment of a stable community at these sites.

3.3.2 Woman Creek

In Woman Creek, the upper two sites generally had sufficient flows to collect macroinvertebrate samples, whereas farther downstream at site WO3, the channel was dry on two out of five sampling events (summer 2001 and 2002). Overall, the most abundant macroinvertebrate group collected was Oligochaeta, which represented 40.5% of the macroinvertebrate community over the five sampling events. This group was dominant on most occasions with a mean relative abundance of 28.4 to 65.1%, except in the spring 2002 when Diptera were most numerous (Figure 3, Appendices D and E). Tubificids were the predominant oligochaete; however, other taxa such as *Nais communis* and *Aulodrilus pigueti* were also relatively abundant as found in Walnut Creek (Table 8). The enchytraeids were only abundant at site WO3 in the fall 2002, although they were common in Walnut Creek. Seasonal abundance of tubificids typically ranged from 18.5 to 41.8% with the highest abundance occurring in drought summer 2002. Tubificids tended to be most numerous at site WO1, where their total densities were generally highest of the three sampling locations (Appendices D and E). *Nais communis* were common in all seasons and were most abundant at sites WO1 and WO2 with percent relative abundances of 8.6 and 8.7%, respectively. *Aulodrilus pigueti* on the other hand was only collected at site WO2 and was not collected in the fall 2001 or spring 2002 (Table 8).

In contrast to Walnut Creek, dipterans were the second most abundant group in Woman Creek with an overall average relative abundance of 29.7% compared to 39.9% in Walnut Creek. Seasonally, Diptera represented 11.8 to 69.9%RA during the sampling period. While dipterans were most abundant in spring

2002, they were least abundant in drought summer 2002. Chironomids were by far the predominant dipterans. Some of the abundant midges were also common to Walnut Creek such as, *Micropsectra* sp. and *Chironomus* sp. However, *Odontomesa* sp., *Rheocricotopus* sp. and *Tanytarsus* sp. were found to be more abundant in Woman Creek (Table 8) and are moderately tolerant of organic pollution (values between 4 and 6). The black flies, *Simulium vittatum* complex were also common but were less abundant than in Walnut Creek because of the scarcity of desirable flowing water habitat in Woman Creek.

Amphipods were always numerous in the summer and were the third most abundant group with an overall mean relative abundance of 11.2%. The ubiquitous *Hyalella azteca* was the most abundant taxon and was predominantly found at site WO2 (19.3%RA), which has the most permanent pool habitat of the three sampling sites.

Mayflies were fairly common at sites WO1 and WO2 with an overall average abundance of 8.6% for the study period. Mayflies were most numerous from the summer 2001 through the spring 2002 (22.2 to 39.1%RA at site WO1, and 0.4 to 14.1%RA at WO2). However, by the summer and fall 2002, mayflies became scarce at site WO1 and were not collected at site WO2, likely in response to drought conditions. Only one mayfly species was relatively abundant, *Caenis bajaensis*, which is moderately tolerant (value of 7). This species was most abundant at site WO1 and most numerous in the fall 2001 and spring 2002 collections (Table 8). *Caenis bajaensis* is a collector-gatherer that prefers quiet water and soft sediments as found in the pool habitats at sites WO1 and WO2.

Considerably fewer caddisflies and damselflies were collected in Woman Creek than in Walnut Creek. The filter-feeding taxon, *Cheumatopsyche* sp. prefers water flowing over gravely areas to build its detritus catching nets. This type of habitat is scarce in Woman Creek.

Gastropods comprised an average of 3.5% of the macroinvertebrate community and consisted mainly of the species *Physa* sp. This common tolerant species was found most often at site WO1 (4.7%) and during the summer 2001 and fall 2002 sampling seasons (Table 8).

Interestingly, Plecoptera were collected in Woman Creek, although they were not particularly abundant. Only one species, *Capnura wanica* was collected at sites WO1 and WO3, and their abundance was <1% and 2.1%RA, respectively.

Total densities were variable ranging from 189 organisms/m^2 at site WO3 in fall 2002 to 14,952 organisms/m^2 at site WO1 in spring 2002 (Figure 2, Appendices D and E). Total densities were highest at site WO1 and lowest at site WO3. Overall, the mean density for the study period was 4,874 organisms/m^2 in Woman Creek (compared to 7,097 organisms/m^2 in Walnut Creek). Taxa richness also varied with a maximum of 48 taxa at site WO1 in fall 2001, and only 6 taxa collected at site WO3 in fall 2002. Site WO3 has always been dry for the summer sampling event, although sufficient flows were present by November in both 2001 and 2002, which allowed for sampling. Consequently, the lack of permanent water at this site (and site WO4) limits colonization and establishment of a diverse benthic community, which was most evident during the 2002 drought. Considering all sites and seasons, the total number of taxa collected in the Woman Creek drainage ranged from 32 to 87, with the fewest number of taxa collected during the drought summer of 2002 (Appendix C).

Species diversity values were moderately high and similar to Walnut Creek with an overall mean diversity of 2.90. Diversity values ranged between 1.59 at WO1 in summer 2002, to 4.11 at site WO1 in summer 2001 (Figure 4). Overall, species diversity was higher at the two upper sites, and comparatively lower at site WO3 likely due to the fact that this site is frequently dry.

HBI values indicate that the majority of the taxa collected were moderate to highly tolerant of environmental stresses. HBI values were generally higher in Woman Creek than in Walnut Creek ranging from 5.63 at site WO1 (spring 2002) to 9.83 at site WO3 (fall 2002) (Figure 4). The high HBI value (near maximum of 10) at site WO3 resulted because the highly tolerant tubificid worms, which have a tolerance value of 10, comprised nearly 96% of the entire macroinvertebrate community in the fall 2002.

ICI scores indicate the Woman Creek macroinvertebrate community was stressed in 2001 and 2002, as 6 of the 13 sampling events had scores in the *poor* category (0-12) (Figure 5). Site WO3 had the lowest ICI scores with 2 in fall 2001 and 0 in fall 2002. Six of the scores were rated as *fair*, ranging from 14 to 34. Only one score was in the *good* category (40 at site WO1 in fall 2001). Mean ICI scores indicate the macroinvertebrate community in Woman Creek is the most stressed of the three drainages studied. The overall mean ICI score was 15.6 for the drainage. Mean ICI scores were 22.4, 15.6, and 8.7 at sites WO1, WO2, and WO3, respectively, indicating site WO3 was most stressed likely due to the lack of permanent water.

3.3.3 Rock Creek

Observed flows in Rock Creek were generally low during the 2001-2002 sampling period and were especially low during the drought summer of 2002. The entire channel was dry at site RC3, thus no sampling was performed, and only a few remnant pools were available for sampling at site RC2. Similar to Walnut Creek, Rock Creek was dominated by dipterans, which overall comprised 33.2% of the macroinvertebrate community for the sampling period. Seasonal mean abundance for dipterans typically ranged from 30.5 to 55.5%, but was only 7.2%RA in the summer 2002 (Figure 3, Appendices D and E). As in the other drainages, chironomids were by far the most abundant of the dipterans, as were the predominant species of *Chironomus* sp., *Cricotopus* sp., and *Micropsectra* sp. (Table 9). Other relatively abundant chironomids were *Nilotanypus* sp., a predator and *Tanytarsus* sp., a collector-gatherer. Both are moderately tolerant (values of 6). The black fly larvae, *Simulium vittatum* complex were also common throughout the drainage. These black flies were most abundant at site RC2 and were most numerous in fall 2001 (Table 9). Although not very numerous in the other two drainages, biting midges of the family Ceratopogonidae were relatively abundant in Rock Creek, especially at site RC1.

Oligochaeta was the second most abundant group and overall comprised 21.0% of the macroinvertebrate community. They were generally most abundant at site RC2, especially in the summer 2002 when they accounted for 86.6% of the macroinvertebrate community (Figure 3, Appendix E). Tubificid worms were the most abundant taxon and overall represented 15.0%RA of the community for all sites and seasons. These worms were most abundant at site RC2 where their mean abundance was 25.9% for the study period (Table 9). However, they were not as well represented at site RC3 (4.3%RA) because of the overwhelming numbers of dipterans (20.3 to 85.8%RA). Although not as numerous as the tubificids, *Nais communis* was also common and most abundant at site RC2.

The amphipod *Hyalella azteca* was also a predominant species in Rock Creek, with an overall mean abundance of 13.0%. Again, they were most abundant in the summer collections. Mean abundances were 18.0, 20.0, and 10.6%RA at sites RC1, RC1M, and RC2, respectively. However, they were either scarce or absent at site RC3 where the overall mean abundance was only 0.2% (Table 9).

Mayflies were most abundant in Rock Creek compared to the other two drainages, and the overall mean abundance was 10.7%. *Caenis bajaensis, Callibaetis* sp., and *Fallceon quilleri* were the most common mayflies and were generally collected at all sites and seasons (Table 9). While *Caenis bajaensis* was numerically dominant at site RC1M (14.5%RA), *Callibaetis* sp. was nearly equal in abundance at sites

RC2 and RC3 (2.5 and 2.4%RA). *Fallceon quilleri* was relatively abundant at sites RC1 and RC2 (4.9 and 5.7%RA). The feeding habit of *Fallceon quilleri* is a collector-gatherer like the other mayfly species.

Of particular interest is the fact that stoneflies were very numerous in Rock Creek, but only at site RC3. Stonefly densities were 3,270 and 1,840 organisms/m^2 in fall of 2001 and 2002, and 10 organisms/m^2 in the spring 2002 (Appendices D and E). Stoneflies were also collected in Woman Creek at sites WO1 and WO3, but in considerably fewer numbers than in Rock Creek, while they were never collected in Walnut Creek. The only two species of stoneflies collected were *Capnura wanica* and *Malenka* sp. with *C. wanica* by far the more abundant. Both species are quite sensitive with tolerance values of 1 and 2, respectively. *Capnura wanica* adults emerge in late fall when they lay their eggs, which will hatch within 3 to 4 weeks (Hynes 1970); consequently, they were very numerous in the fall samples. The nymphs are long and thin and can burrow into the stream's hyporheic zone as surface flows diminish. They also have a resting (or dipause) stage that allows them to re-surface when flow conditions become more suitable. Such flow conditions appear to be fairly common in the Rock Creek drainage.

Both gastropods and bivalves (order Mollusca) were common in Rock Creek. *Physa* sp. was the predominant gastropod, as found in the other drainages, especially in 2001 (summer and fall); whereas, the bivalve *Pisidium* sp. (fingernail clam) was most abundant in 2002 (summer and fall). Both *Physa* sp. and *Pisidium* sp. were most abundant at site RC1 than at the other sites during the sampling period (Table 9).

Total macroinvertebrate densities were generally higher in Rock Creek than in the other two drainages with an overall mean density of 9,900 organisms/m^2. Site RC1M had the highest mean density at 14,466 organisms/m^2 at site RC1M, while the lowest mean density was 3,620 organisms/m^2 at site RC1. During the sampling period, total densities ranged from 1,476 organisms/m^2 at site RC1 in fall 2002, to 36,038 organisms/m^2 at site RC3 also in fall 2002 (Figure 2, Appendices D and E). Total numbers of taxa collected were also generally higher in Rock Creek than in the other drainages undoubtedly because of the comparatively greater diversity of habitat (Figure 2). Species richness ranged from 19 taxa at site RC1M in summer 2002, to 61 taxa at site RC2 in spring 2002. For all sites and seasons, species richness in the Rock Creek drainage ranged from 55 to 93 taxa. Again, the fewest number of taxa were collected during the summer 2002 sampling event likely due to the drought (Appendix C).

Overall, the mean species diversity for Rock Creek was higher than in the other drainages with a mean diversity of 3.52, with little variation among sites (3.33 to 3.63). Individual species diversity values were

moderately high and ranged from 1.92 at site RC2 in summer 2002, to 4.55 also at site RC2 in the spring 2002 (Figure 4). These relatively high species diversity values indicate a diverse macroinvertebrate community, although HBI and ICI values show the fauna consists mostly of hardy and tolerant organisms as found in the other drainages.

HBI values were generally high, as the species assemblage in Rock Creek was generally tolerant of environmental stresses. HBI values were generally similar to those in Woman Creek and Walnut Creek and ranged from 5.19 at site RC3 in spring 2002, to 9.47 at site RC2 in summer 2002 (Figure 4). The reason for the elevated HBI score at site RC2 in summer 2002 was the overwhelming abundance of tubificid worms (81.5%), which was also noted in Woman Creek at site WO1 in the spring 2002.

ICI scores also indicate the presence of a stressed macroinvertebrate community in the summer 2002 when 2 of the 17 sampling events had ICI scores in the *poor* category (2 and 6 at sites RC1M and RC2, respectively). Otherwise, scores on 13 occasions were rated as *fair* (20-34), and 2 were rated as *good* (40 and 38 at sites RC2 and RC3 in fall 2001) (Figure 5). According to mean ICI scores, the macroinvertebrate community in Rock Creek is probably the least stressed of the three drainages studied. The overall mean ICI score was 23.7 in Rock Creek with mean scores between 21.3 and 26.5 for individual sites.

3.3.4 Summary

The macroinvertebrate communities in streams draining Rocky Flats are generally similar to each other in that they were dominated by same groups of organisms namely, dipterans, oligochaetes, amphipods, molluscs, and a few mayflies. Within each of these groups, the species collected were also quite similar with a few exceptions. For example, the predominant mayflies in Walnut Creek were *Baetis tricaudatus* and *Callibaetis* sp., whereas in Woman Creek only *Caenis bajaensis* was dominant. In Rock Creek, both *C. bajaensis* and *Callibaetis* sp. were predominant as well as *Fallceon quilleri.* The caddisfly *Cheumatopsyche* sp. was only predominant at site WC3 where the flows are stable and effluent-dominated. The predominance of *Cheumatopsyche* sp. and other filter-feeding organisms at site WC3 will likely change after cessation of effluent discharges because of reduced stream flows and availability of suspended organic matter. Also of interest is that stoneflies were only collected at sites RC3, WO1, and WO3, and while not particularly abundant in Woman Creek, they were quite numerous at site RC3 on two occasions (fall 2001 and 2002). Overall, both total densities and taxa richness were highest in Rock Creek and lowest in Woman Creek. Mean species diversity values were also highest in Rock Creek

where the greatest habitat diversity is found. The macroinvertebrate community in Rock Creek is probably the least stressed of the three drainages studied. Whereas, the community in Woman Creek appeared to be the most stressed of the drainages because it had highest mean HBI value the lowest mean ICI scores (six scores were in the poor category during the study period), particularly at site WO3 where the lack of permanent water limits the establishment of the benthic community. This is also the case at sites WC4 and WC5 in Walnut Creek where the community is significantly affected by the interrupted flow regime.

3.3.5 Comparisons to Other Studies

Big Dry Creek Monitoring Program

In comparison to results of ongoing monitoring studies in Big Dry Creek and lower Walnut Creek, no major differences were apparent other than the presence of stoneflies in Rock and Woman Creeks. At the upper Big Dry Creek sites (bdc0.5, bdc1.0, bdc1.5, and bdc1.5C), densities and numbers of taxa were generally similar and the predominant groups were also dipterans and oligochaetes (Aquatics Associates, Inc. 2002). However, more species and numbers of mayflies and caddisflies and other insect taxa were present at the upper Big Dry Creek sites. The tolerant species of mayflies *Callibaetis* sp. and *Caenis bajaensis* that were predominant in Rocky Flats streams, were also present at these sites but in considerably fewer numbers. These species appear to have been replaced (in upper Big Dry Creek) by the more sensitive species *Baetis tricaudatus* and *Tricorythodes minutus.* Predominant species of chironomids were very similar to those found in Rocky Flats streams and included *Cricotopus* sp., *Dicrotendipes* sp., and *Micropsectra* sp. while the dominant black flies were also *Simulium vittatum* complex. Dominant molluscs were also physid snails and fingernail clams of the species *Pisidium* sp. Total densities in both upper Big Dry Creek and the Rocky Flats drainages varied widely but the range of densities (lows and highs) was generally lower in the Rocky Flats streams. Species richness was also generally similar, however, on certain occasions it was extremely variable in the Rocky Flats drainages as evidenced by the presence of only a few species and high densities at sites WC4 and WC5 in fall 2002. HBI values in the upper Big Dry Creek sites tended to be lower, while ICI scores were generally higher than those recorded for the Rocky Flats streams.

The predominant species found at the lower Walnut Creek sites (D2, W1, and W2) were similar to the streams at Rocky Flats, especially in Walnut Creek (WC1 through WC5) (Aquatics Associates, Inc. 2002). Total densities and taxa richness were also generally similar (except for the extreme case at sites

WC4 and WC5) to that found in lower Walnut Creek. Although HBI values for the Rocky Flats sites were slightly higher than for the lower Walnut Creek sites, the ICI scores were similar with the majority of scores in the *fair* category and only a few in the *good* and *poor* categories.

Macroinvertebrate communities in both upper Big Dry and lower Walnut Creeks were somewhat more abundant, rich, and sensitive than the communities found in the Rocky Flats drainages, which is most likely due to the more permanent flows and higher discharges. Overall, the Big Dry Creek macroinvertebrate study results suggest minimal water quality impacts associated with Site discharges.

Other Studies

In comparison to a previous aquatic macroinvertebrate study of Rocky Flats streams conducted by DOE (1992), the 2001-2002 sampling results were generally similar in terms of numbers of taxa, densities, and community structure. As concluded in the current study, the intermittent nature and lack of sustained stream flows was also implicated as the major limiting factor for sustaining healthy and balanced macroinvertebrate communities in lower Walnut Creek (sites D2, W1, and W2) and at one site at Rocky Flats (site D1) in a 1991 to 1994 study (Wright Water Engineers, Inc. 1995).

The 2001 and 2002 findings are also generally similar to macroinvertebrate communities in studies of other transitional foothills-plains and plains type streams. A study of three prairie streams in Nebraska were generally dominated by Oligochaeta, Baetidae and *Tricorythodes* mayflies, Hydropsychidae caddisflies, with Diptera consisting mainly of the midge subfamilies Chironomini and Orthocladiini and the black fly, *Simulium vittatum* (Harris et al. 2000). These same organisms were also predominant in a study of the plains section of the Cache la Poudre River in northern Colorado conducted by Colorado State University (Shieh et al. 1999) and in a study of several other Front Range streams (Zuellig 2001). Notably scarce in these studies was the amphipod *Hyalella azteca*, while they were relatively abundant in the Rocky Flats drainages. *Hyalella azteca,* however was found to be relatively abundant in Crow Creek, a stream in the plains of Wyoming, as were several of the same chironomid species found in the Rocky Flats drainages (Hubert 1996).

Reviews of related water quality studies did not indicate any discernable water quality impacts to the benthic macroinvertebrate communities in the Rocky Flats drainages (DOE 2003, Wright Water Engineers, Inc. 1995). In the 2002 ammonia study, concentrations of ammonia, nitrates, and nitrites were usually well below the State water quality criteria for these parameters (DOE 2003). Likewise, in the study by Wright Water Engineers, Inc. no nutrients and only a few metals were in exceedance of water quality standards (Wright Water Engineers, Inc. 1995). They concluded that the metals exceedances, which were in the ponds in Walnut Creek, were not sufficiently high to have caused any discernable effects on the macroinvertebrate communities.

4.0 RECOMMENDATIONS

1. Habitat assessment follow-up surveys, which are an integral part of the monitoring program, should be continued in the fall to document physical habitat changes. This is especially important considering the planned site closure activities such as wastewater treatment plant closure in September 2004, reduced discharges from the terminal ponds to Walnut Creek, removal of ponds in the Walnut and Woman Creek drainages, removal of buildings and impervious surfaces, etc.

2. While the 2001 fish sampling results provided an adequate baseline for existing conditions, fish monitoring should be continued in 2003 to determine the stability of fish communities in streams at the Site especially considering the 2002 drought. Subsequent fish surveys should also include sampling at site RC1M, which was added to the program in spring 2002, but has not yet been sampled. Future surveys on a 2-3 year basis should be sufficient to monitor fish populations and their stability in drainages at the Site.

3. Macroinvertebrate monitoring should be continued at all sites in 2003 with sampling frequency (spring, summer, and fall) and data collection/analysis methods consistent with previous years. In subsequent years, sampling frequency would be continued on an annual basis, but would be reduced to one or two seasonal events based on 2003 results.

4. The feasibility of macroinvertebrate collections using artificial substrates (Hester-Dendy) was evaluated. Based on site observations, this method was deemed inappropriate because of stream flow and depth limitations. Furthermore, multi-habitat kick net sampling is still the most appropriate method for these types of streams, and also the preferred methodology of the CDPHE-WQCD and other agencies.

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APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

Riffle-run habitat at site WC1 on North Walnut Creek below SW093, above A-1 Bypass, May 2002

Pool and run habitats at site WC2 on South Walnut Creek near GS10, above B-1 Bypass, May 2002

Incised channel and actively eroding banks at site WC3 on South Walnut Creek between Ponds B-4 and B-5, July 2002

Site WC4 on mainstem downstream from the confluence of North and South Walnut Creeks, downstream from terminal ponds and No Name Gulch.

A few days after discharge event from terminal ponds, May 2002.

Dry channel at site WC4 between discharge events, July 2002.

Site WC5 on mainstem Walnut Creek upstream from GS03 and Indiana Street Pond.

Remnant pool after discharge event from terminal ponds, May 2002.

Dry channel at site WC5 between discharge events, July 2002.

Site WO1 on Woman Creek downstream from the confluence with Antelope Springs Creek, upstream from Pond C-1, May 2002.

Pool and riffle -run habitats at site WO2 on Woman Creek downstream from Pond C-1, May 2002.

Large pool at site WO3 in Pond C-2 Bypass near toe of dam, May 2002.

Site RC1 on the North Fork of the Middle Fork Rock Creek, May 2002.

Narrow channel and shallow riffle-run habitat downstream from cattail marsh.

Site RC1M on the North Fork of the Middle Fork Rock Creek upstream from the confluence with the mainstem, May 2002.

Pool habitat with watercress, algae, and duckweed.

Shallow riffle-run habitat at site RC1M.

Site RC2 on mainstem Rock Creek downstream from Lindsey Pond, May 2002.

Site RC3 on mainstem Rock Creek upstream from the confluence with the North and South Forks, May 2002.

Large deep pool at lower end of site RC3.

Site RC3 on mainstem Rock Creek.

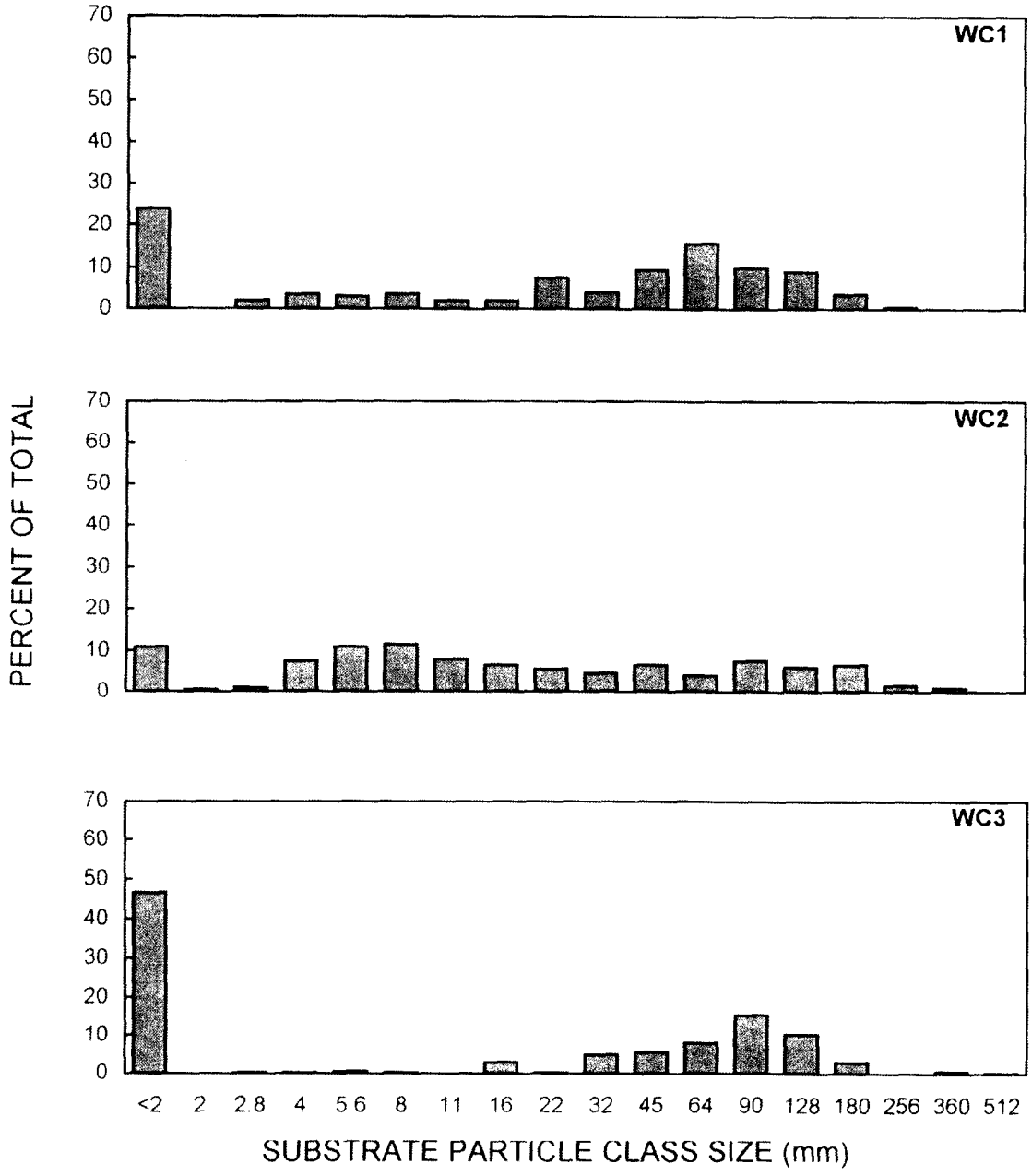
Macroinvertebrate sampling with kick net in riffle-run habitat, May 2002.

Dry channel during the drought summer (July) 2002.

APPENDIX B

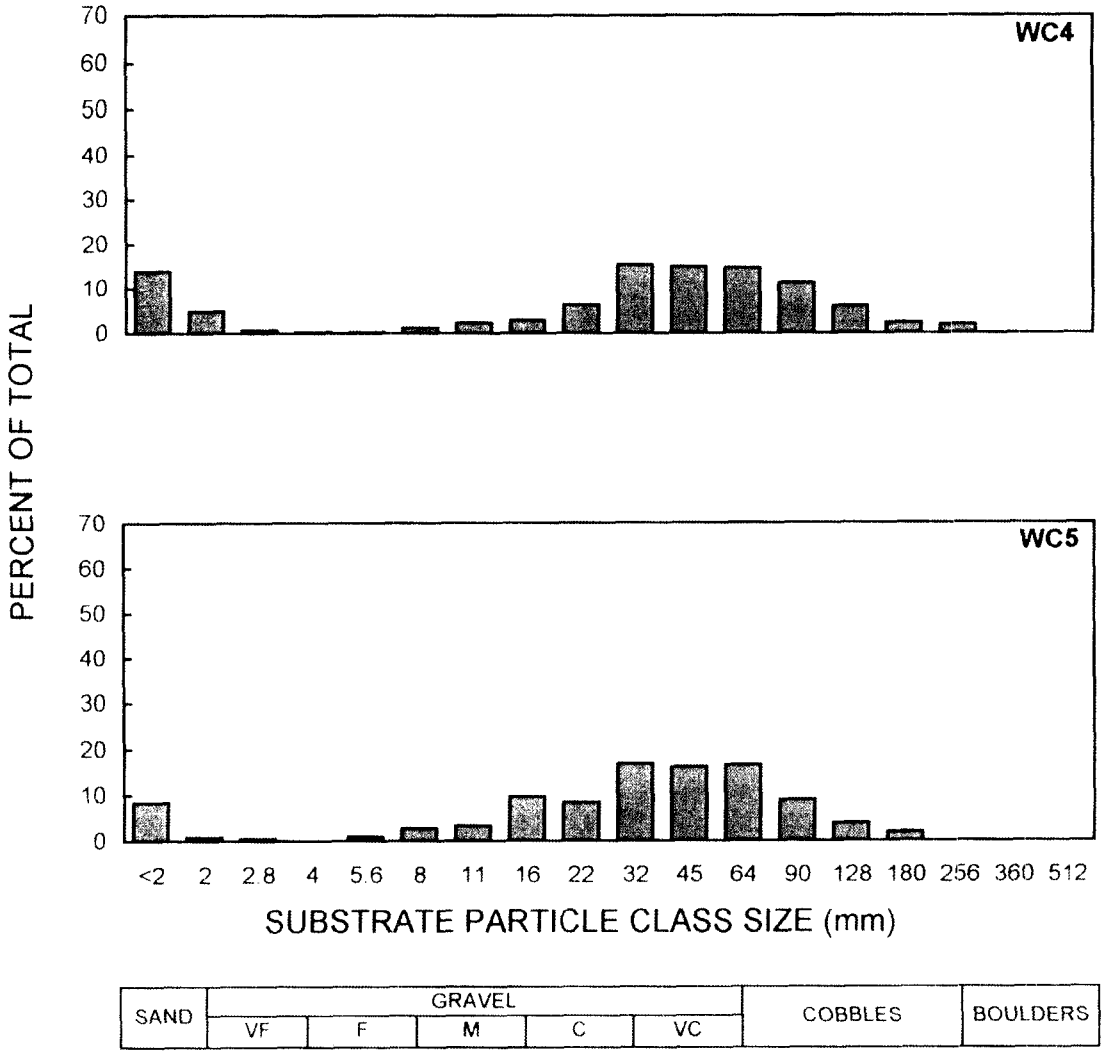
SUBSTRATE PARTICLE SIZE DISTRIBUTION DATA

SUBSTRATE PARTICLE SIZE DISTRIBUTION FOR STUDY SITES ON WALNUT CREEK, FALL 2001



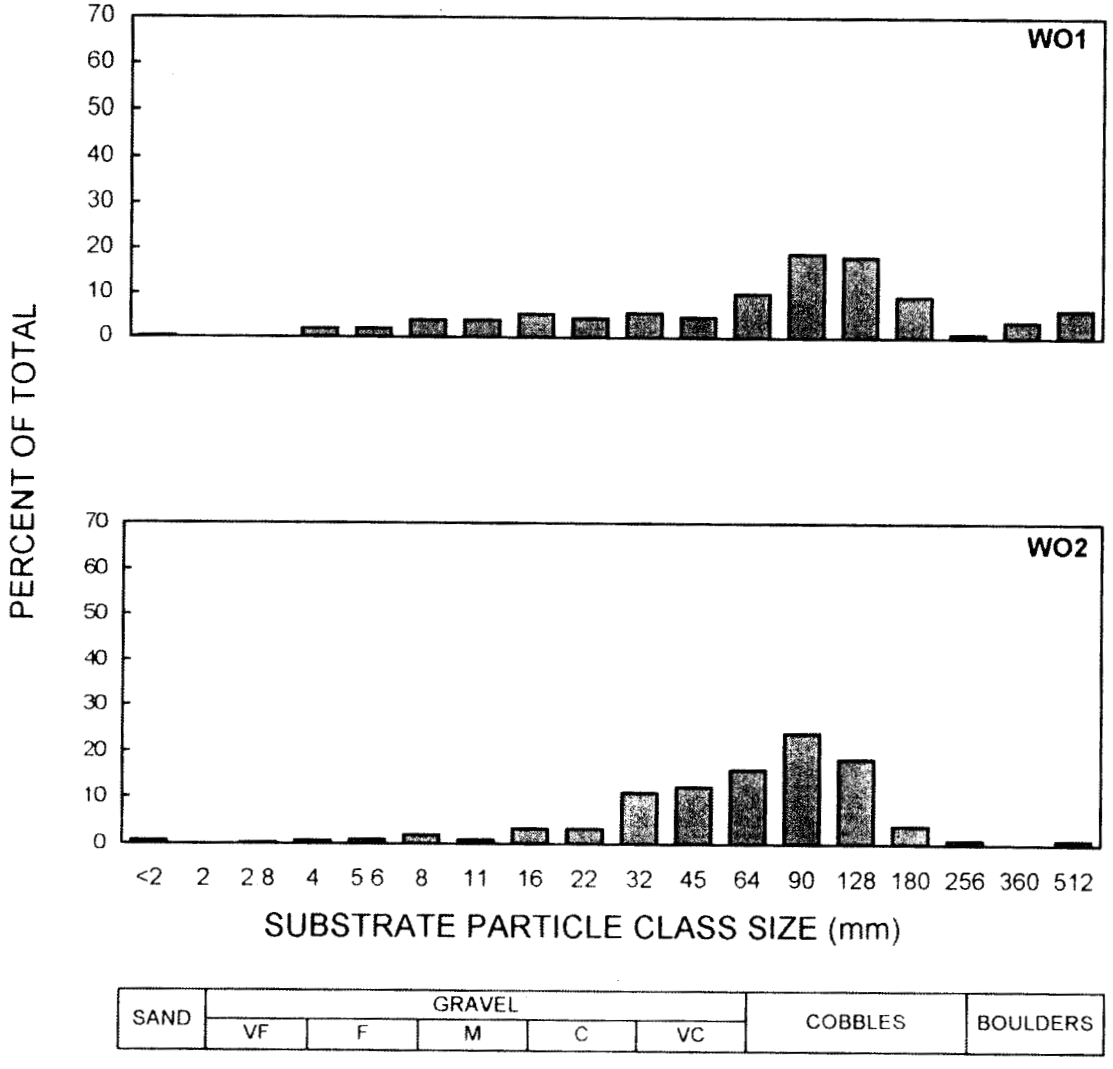
SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

SUBSTRATE PARTICLE SIZE DISTRIBUTION FOR STUDY SITES ON WALNUT CREEK, FALL 2001

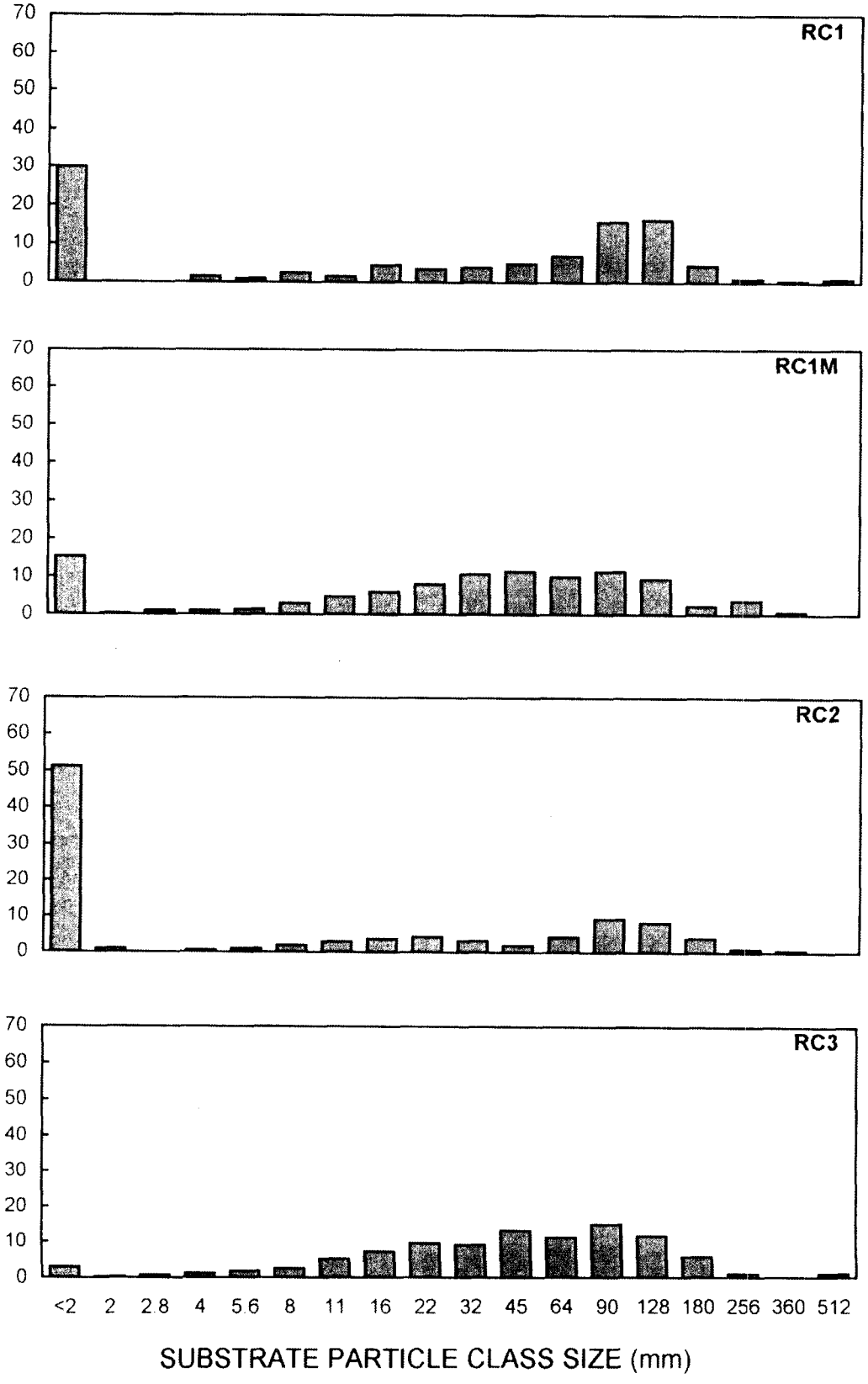


SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

SUBSTRATE PARTICLE SIZE DISTRIBUTION FOR STUDY SITES ON WOMAN CREEK, FALL 2001

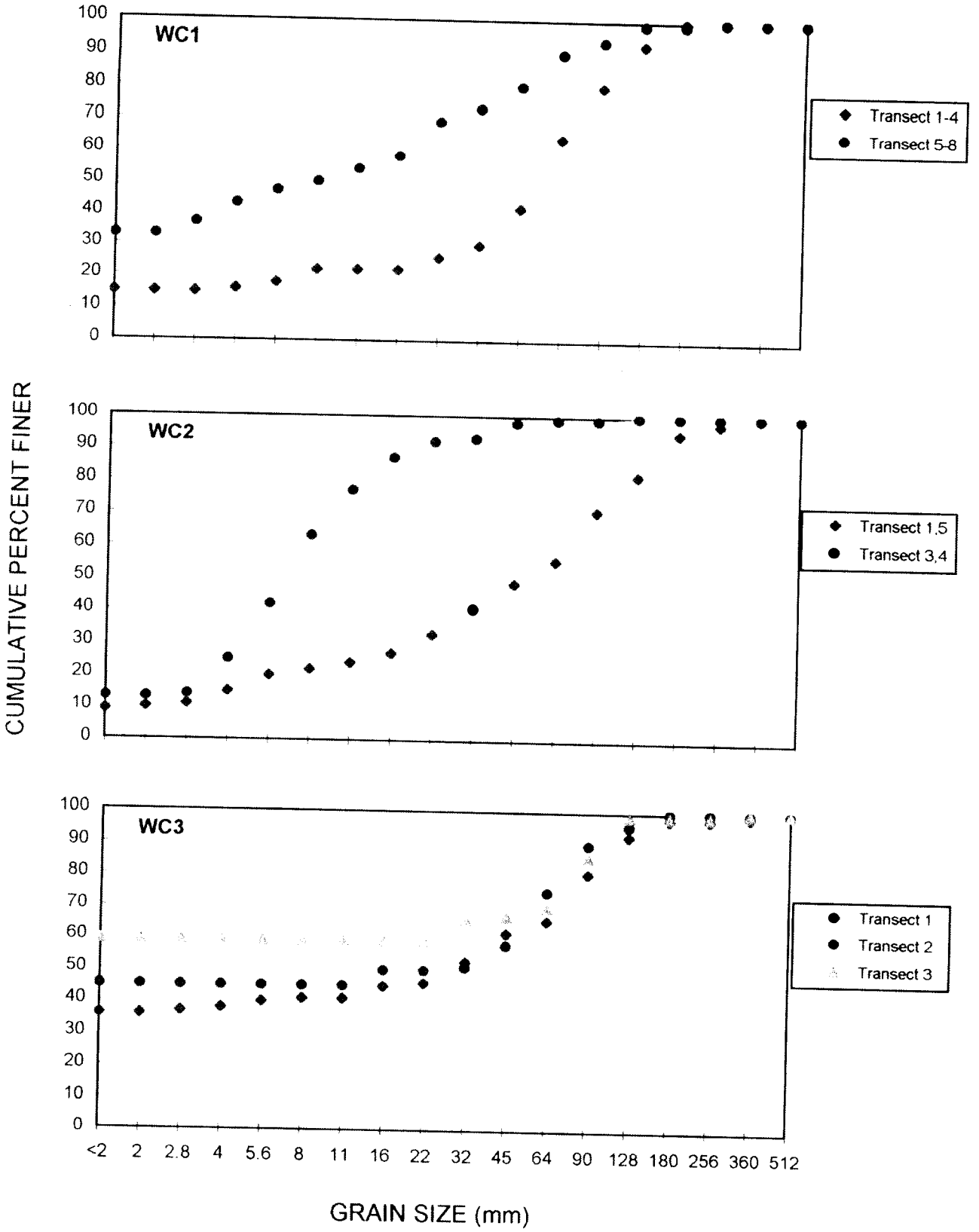


SUBSTRATE PARTICLE SIZE DISTRIBUTION FOR STUDY SITES ON ROCK CREEK, FALL 2001 AND 2002



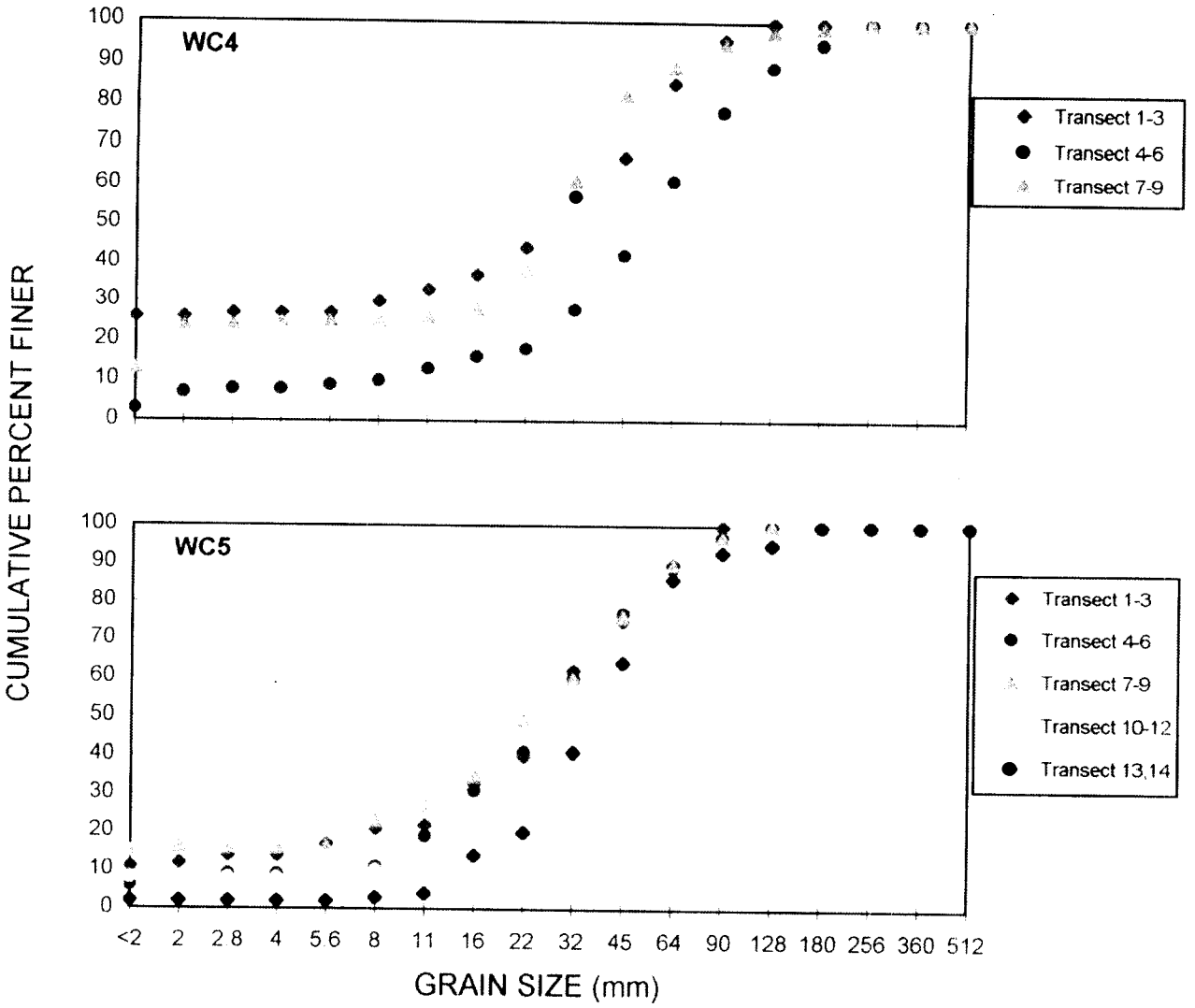
SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

WOLMAN PLOTS FOR STUDY SITES ON WALNUT CREEK, FALL 2001



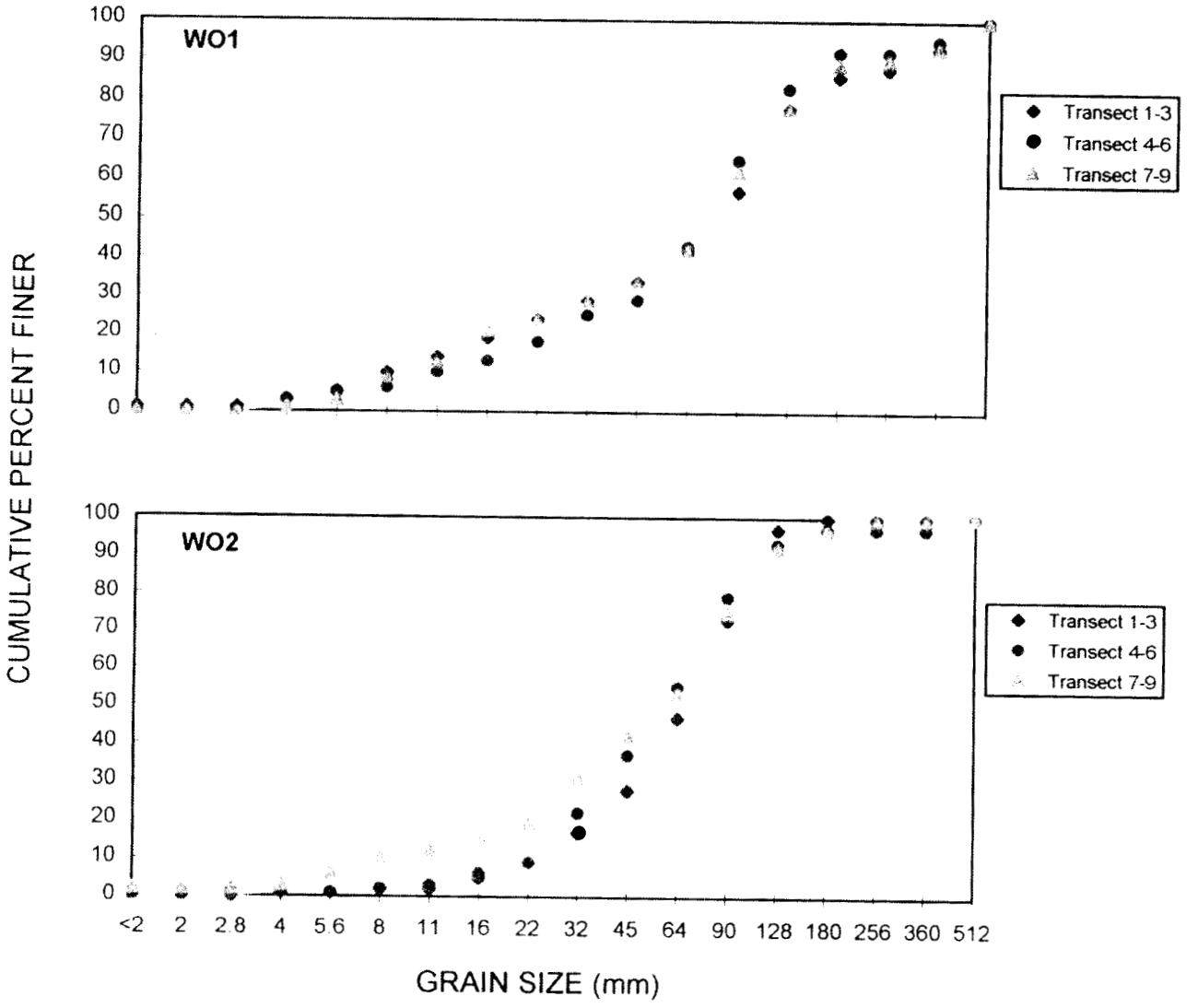
SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

WOLMAN PLOTS FOR STUDY SITES ON WALNUT CREEK, FALL 2001



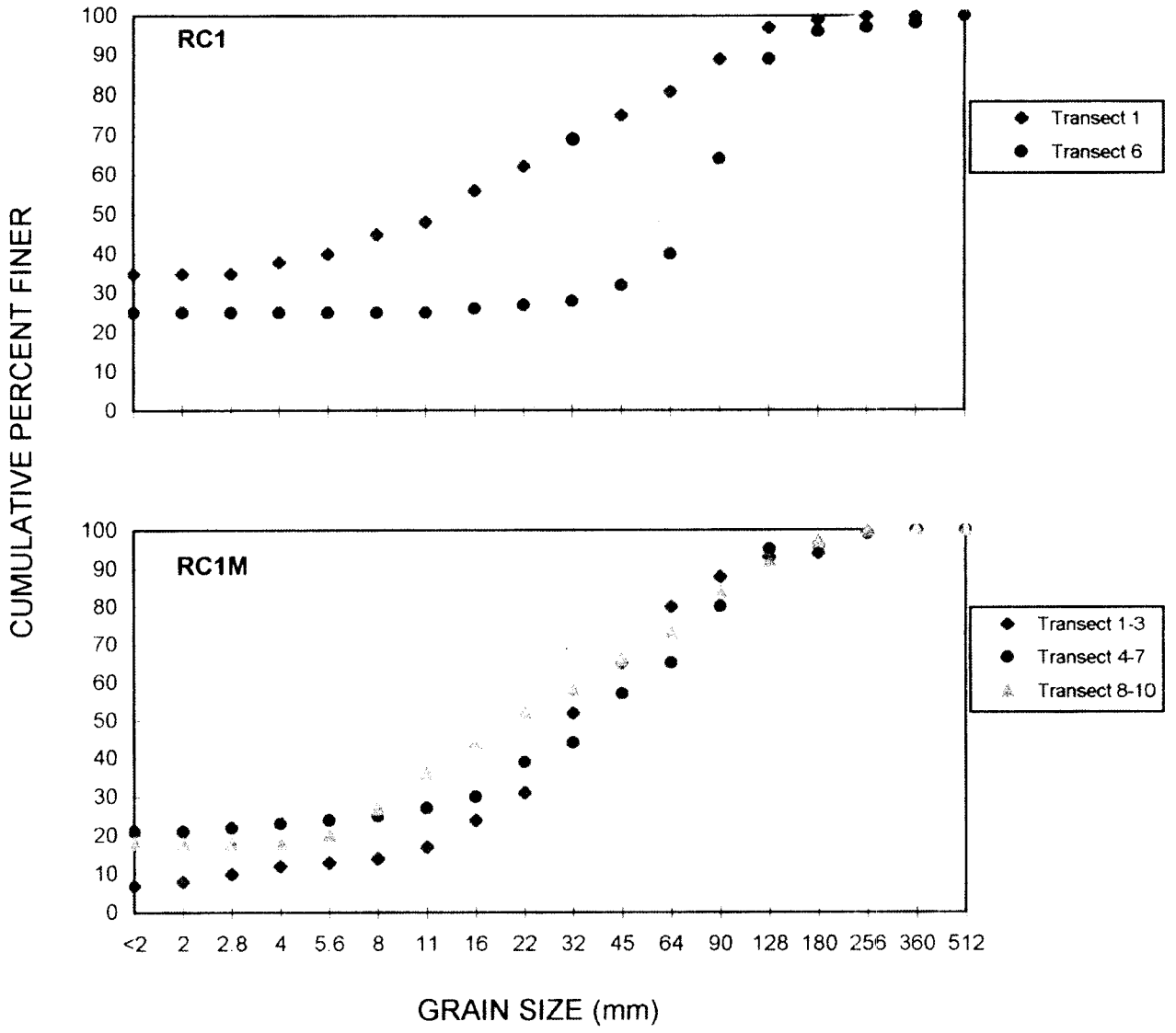
SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

WOLMAN PLOTS FOR STUDY SITES ON WOMAN CREEK, FALL 2001



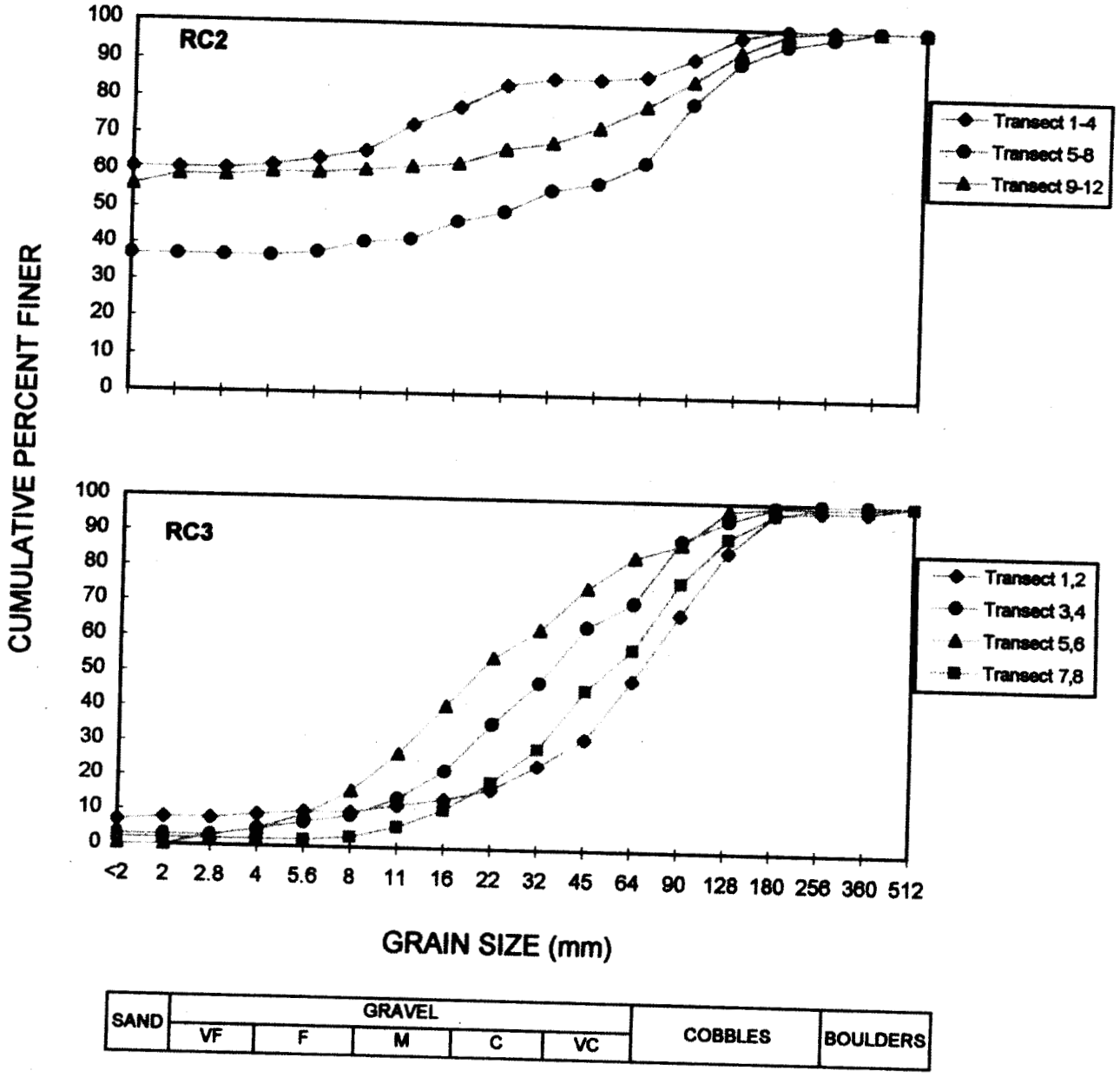
SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

WOLMAN PLOTS FOR STUDY SITES ON ROCK CREEK,
FALL 2001 AND 2002



SAND	GRAVEL					COBBLES	BOULDERS
	VF	F	M	C	VC		

WOLMAN PLOTS FOR STUDY SITES ON ROCK CREEK, FALL 2001



WALNUTCREEK

WOLMAN DATA
Sample Date: 10/30/01

WC1 Walnut Creek

Transect # 1-4 Clay=15/15

Substrate Size (mm)	count	% total	% passing
<2	15	15	15
2	0	0	15
2.8	0	0	15
4	1	1	16
5.6	2	2	18
8	4	4	22
11	0	0	22
16	0	0	22
22	4	4	26
32	4	4	30
45	12	12	42
64	22	22	64
90	16	16	80
128	13	13	93
180	7	7	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	4.0
D50=	51.9
D84=	101.7
SORT=	5.042

Transect # 5-8 Clay=33/33

Substrate Size (mm)	count	% total	% passing
<2	33	33	33
2	0	0	33
2.8	4	4	37
4	6	6	43
5.6	4	4	47
8	3	3	50
11	4	4	54
16	4	4	58
22	11	11	69
32	4	4	73
45	7	7	80
64	10	10	90
90	4	4	94
128	5	5	99
180	0	0	99
256	1	1	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	N/A 1/
D50=	8.0
D84=	52.6
SORT=	N/A 1/

Site Averages

Mean D16=	4.0
Mean D50=	30.0
Mean D84=	77.1
Mean SORT=	5.0

1/ Value cannot be calculated.

WALNUTCREEK

WOLMAN DATA
Sample Date: 11/06/01

WC2 Walnut Creek

Transect # 1,5 Clay=8/9

Substrate Size (mm)	count	% total	% passing
<2	9	9	9
2	1	1	10
2.8	1	1	11
4	4	4	15
5.6	5	5	20
8	2	2	22
11	2	2	24
16	3	3	27
22	6	6	33
32	8	8	41
45	8	8	49
64	7	7	56
90	15	15	71
128	11	11	82
180	13	13	95
256	3	3	98
360	2	2	100
512	0	0	100
TOTAL	100	100	

D16=	4.3
D50=	47.7
D84=	136.0
SORT=	5.611

Transect # 3,4 Clay=13/13

Substrate Size (mm)	count	% total	% passing
<2	13	13	13
2	0	0	13
2.8	1	1	14
4	11	11	25
5.6	17	17	42
8	21	21	63
11	14	14	77
16	10	10	87
22	5	5	92
32	1	1	93
45	5	5	98
64	1	1	99
90	0	0	99
128	1	1	100
180	0	0	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	3.0
D50=	6.3
D84=	14.5
SORT=	2.192

Site Averages

Mean D16=	3.7
Mean D50=	27.0
Mean D84=	75.3
Mean SORT=	3.9

WOLMAN DATA
Sample Date: 10/29/01

WC3 Walnut Creek

Transect # 2-5 Clay=33/36

Substrate Size (mm)	count	% total	% passing
<2	36	36	36
2	0	0	36
2.8	1	1	37
4	1	1	38
5.6	2	2	40
8	1	1	41
11	0	0	41
16	4	4	45
22	1	1	46
32	7	7	53
45	9	9	62
64	4	4	66
90	15	15	81
128	12	12	93
180	5	5	98
256	0	0	98
360	1	1	99
512	1	1	100
TOTAL	100	100	

D16= N/A 1/
D50= 27.7
D84= 99.5
SORT= N/A 1/

Transect # 5-7 Clay=45/45

Substrate Size (mm)	count	% total	% passing
<2	45	45	45
2	0	0	45
2.8	0	0	45
4	0	0	45
5.6	0	0	45
8	0	0	45
11	0	0	45
16	5	5	50
22	0	0	50
32	1	1	51
45	7	7	58
64	17	17	75
90	15	15	90
128	6	6	96
180	4	4	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16= N/A 1/
D50= 16.0
D84= 79.6
SORT= N/A 1/

Transect # 8-10 Clay=59/59

Substrate Size (mm)	count	% total	% passing
<2	59	59	59
2	0	0	59
2.8	0	0	59
4	0	0	59
5.6	0	0	59
8	0	0	59
11	0	0	59
16	0	0	59
22	0	0	59
32	7	7	66
45	1	1	67
64	3	3	70
90	16	16	86
128	13	13	99
180	0	0	99
256	0	0	99
360	1	1	100
512	0	0	100
TOTAL	100	100	

D16= N/A 1/
D50= N/A 1/
D84= 86.8
SORT= N/A 1/

Site Averages	
Mean D16=	N/A
Mean D50=	21.9
MeanD84=	88.6
Mean SORT=	N/A

1/ Value cannot be calculated.

WOLMAN DATA
Sample Date: 11/07/01

WC4 Walnut Creek

Transect # 1-3 Clay=26/26

Substrate Size (mm)	count	% total	% passing
<2	26	26	26
2	0	0	26
2.8	1	1	27
4	0	0	27
5.6	0	0	27
8	3	3	30
11	3	3	33
16	4	4	37
22	7	7	44
32	13	13	57
45	10	10	67
64	18	18	85
90	11	11	96
128	4	4	100
180	0	0	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	N/A 1/
D50=	26.6
D84=	62.9
SORT=	N/A 1/

Transect # 4-6 Clay=3/3

Substrate Size (mm)	count	% total	% passing
<2	3	3	3
2	4	4	7
2.8	1	1	8
4	0	0	8
5.6	1	1	9
8	1	1	10
11	3	3	13
16	3	3	16
22	2	2	18
32	10	10	28
45	14	14	42
64	19	19	61
90	17	17	78
128	11	11	89
180	6	6	95
256	5	5	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	16.0
D50=	51.0
D84=	110.7
SORT=	2.631

Transect # 7-9 Clay=13/13

Substrate Size (mm)	count	% total	% passing
<2	13	13	13
2	11	11	24
2.8	0	0	24
4	1	1	25
5.6	0	0	25
8	0	0	25
11	1	1	26
16	2	2	28
22	10	10	38
32	23	23	61
45	21	21	82
64	7	7	89
90	6	6	95
128	3	3	98
180	1	1	99
256	1	1	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	0.3 2/
D50=	27.2
D84=	50.4
SORT=	13.482

Site Averages	
Mean D16=	8.1
Mean D50=	34.9
Mean D84=	74.7
Mean SORT=	8.1

1/ Value cannot be calculated.
2/ Calculated using the substrate particle size of 0.031 mm for coarse-medium silt (Platts et al. 1983).

WALNUTCREEK

WOLMAN DATA
Sample Date: 10/29/01

WC5 Walnut Creek

Transect # 1-3 Clay=0/11

Substrate Size (mm)	count	% total	% passing
<2	11	11	11
2	1	1	12
2.8	2	2	14
4	0	0	14
5.6	3	3	17
8	4	4	21
11	1	1	22
16	11	11	33
22	7	7	40
32	22	22	62
45	13	13	75
64	15	15	90
90	10	10	100
128	0	0	100
180	0	0	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	5.1
D50=	26.5
D84=	56.4
SORT=	3.336

Transect # 4-6 Clay=0/6

Substrate Size (mm)	count	% total	% passing
<2	6	6	6
2	2	2	8
2.8	1	1	9
4	0	0	9
5.6	0	0	9
8	2	2	11
11	8	8	19
16	12	12	31
22	10	10	41
32	19	19	60
45	17	17	77
64	12	12	89
90	8	8	97
128	3	3	100
180	0	0	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	9.9
D50=	26.7
D84=	56.1
SORT=	2.383

Transect # 7-9 Clay=0/15

Substrate Size (mm)	count	% total	% passing
<2	15	15	15
2	1	1	16
2.8	0	0	16
4	0	0	16
5.6	1	1	17
8	6	6	23
11	4	4	27
16	8	8	35
22	14	14	49
32	11	11	60
45	16	16	76
64	14	14	90
90	7	7	97
128	3	3	100
180	0	0	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	2.0
D50=	22.9
D84=	55.9
SORT=	5.285

Transect # 10-12 Clay=8/8

Substrate Size (mm)	count	% total	% passing
<2	8	8	8
2	0	0	8
2.8	0	0	8
4	0	0	8
5.6	1	1	9
8	1	1	10
11	3	3	13
16	8	8	21
22	5	5	26
32	12	12	38
45	12	12	50
64	20	20	70
90	13	13	83
128	12	12	95
180	5	5	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	12.9
D50=	45.0
D84=	93.2
SORT=	2.690

WC5 (Continued)

Transect # 13,14 Clay=2/2

Substrate Size (mm)	count	% total	% passing
<2	2	2	2
2	0	0	2
2.8	0	0	2
4	0	0	2
5.6	0	0	2
8	1	1	3
11	1	1	4
16	10	10	14
22	6	6	20
32	21	21	41
45	23	23	64
64	22	22	86
90	7	7	93
128	2	2	95
180	5	5	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	18.0
D50=	37.1
D84=	62.3
SORT=	1.860

Site Averages	
Mean D16=	9.6
Mean D50=	31.7
Mean D84=	64.8
Mean SORT=	3.1

WOMAN CREEK

WOLMAN DATA
Sample Date: 10/31/01

WO1 Woman Creek

Transect # 1-3 Clay=1/1

Substrate Size (mm)	count	% total	% passing
<2	1	1	1
2	0	0	1
2.8	0	0	1
4	2	2	3
5.6	2	2	5
8	5	5	10
11	4	4	14
16	5	5	19
22	5	5	24
32	5	5	29
45	5	5	34
64	8	8	42
90	15	15	57
128	21	21	78
180	8	8	86
256	2	2	88
360	5	5	93
512	7	7	100
TOTAL	100	100	

D16=	13.0
D50=	77.9
D84=	167.0
SORT=	3.584

Transect # 4-6

Substrate Size (mm)	count	% total	% passing
<2	0	0	0
2	0	0	0
2.8	0	0	0
4	3	3	3
5.6	2	2	5
8	1	1	6
11	4	4	10
16	3	3	13
22	5	5	18
32	7	7	25
45	4	4	29
64	14	14	43
90	22	22	65
128	18	18	83
180	9	9	92
256	0	0	92
360	3	3	95
512	5	5	100
TOTAL	100	100	

D16=	19.6
D50=	72.3
D84=	133.8
SORT=	2.613

Transect # 7-9

Substrate Size (mm)	count	% total	% passing
<2	0	0	0
2	0	0	0
2.8	0	0	0
4	1	1	1
5.6	2	2	3
8	6	6	9
11	4	4	13
16	8	8	21
22	3	3	24
32	5	5	29
45	5	5	34
64	8	8	42
90	20	20	62
128	16	16	78
180	11	11	89
256	1	1	90
360	3	3	93
512	7	7	100
TOTAL	100	100	

D16=	12.9
D50=	74.4
D84=	156.4
SORT=	3.485

Site Averages	
Mean D16=	15.2
Mean D50=	74.8
MeanD84=	152.4
Mean SORT=	3.2

WOLMAN DATA
Sample Date: 10/31/01

WO2 Woman Creek

Transect # 1-3

Substrate Size (mm)	count	% total	% passing
<2	0	0	0
2	0	0	0
2.8	0	0	0
4	1	1	1
5.6	0	0	1
8	1	1	2
11	0	0	2
16	3	3	5
22	4	4	9
32	8	8	17
45	11	11	28
64	19	19	47
90	26	26	73
128	24	24	97
180	3	3	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	30.8
D50=	67.0
D84=	107.4
SORT=	1.869

Transect # 4-6

Substrate Size (mm)	count	% total	% passing
<2	0	0	0
2	0	0	0
2.8	1	1	1
4	0	0	1
5.6	0	0	1
8	1	1	2
11	1	1	3
16	3	3	6
22	3	3	9
32	13	13	22
45	15	15	37
64	18	18	55
90	24	24	79
128	14	14	93
180	4	4	97
256	0	0	97
360	0	0	97
512	3	3	100
TOTAL	100	100	

D16=	27.4
D50=	58.7
D84=	103.6
SORT=	1.945

Transect # 7-9 Clay=0/2

Substrate Size (mm)	count	% total	% passing
<2	2	2	2
2	0	0	2
2.8	0	0	2
4	1	1	3
5.6	3	3	6
8	4	4	10
11	2	2	12
16	4	4	16
22	3	3	19
32	12	12	31
45	11	11	42
64	11	11	53
90	22	22	75
128	17	17	92
180	5	5	97
256	3	3	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	16.0
D50=	58.8
D84=	110.1
SORT=	2.623

Site Averages	
Mean D16=	24.7
Mean D50=	61.5
MeanD84=	107.0
Mean SORT=	2.1

ROCK CREEK

WOLMAN DATA
Sample Date: 11/6/02

RC1M Rock Creek

Transect # 1-3 Clay=0/7

Substrate Size (mm)	count	% total	% passing
<2	7	7	7
2	1	1	8
2.8	2	2	10
4	2	2	12
5.6	1	1	13
8	1	1	14
11	3	3	17
16	7	7	24
22	7	7	31
32	21	21	52
45	13	13	65
64	15	15	80
90	8	8	88
128	5	5	93
180	1	1	94
256	5	5	99
360	1	1	100
512	0	0	100
TOTAL	100	100	

D16=	10.0
D50=	31.0
D84=	77.0
SORT=	2.775

Transect # 4-7 Clay=0/21

Substrate Size (mm)	count	% total	% passing
<2	21	21	21
2	0	0	21
2.8	1	1	22
4	1	1	23
5.6	1	1	24
8	1	1	25
11	2	2	27
16	3	3	30
22	9	9	39
32	5	5	44
45	13	13	57
64	8	8	65
90	15	15	80
128	15	15	95
180	1	1	96
256	3	3	99
360	1	1	100
512	0	0	100
TOTAL	100	100	

D16=	N/A 1/
D50=	38.0
D84=	100.1
SORT=	N/A 1/

Transect # 8-10 Clay=0/18

Substrate Size (mm)	count	% total	% passing
<2	18	18	18
2	0	0	18
2.8	0	0	18
4	0	0	18
5.6	2	2	20
8	7	7	27
11	9	9	36
16	8	8	44
22	8	8	52
32	6	6	58
45	8	8	66
64	7	7	73
90	11	11	84
128	8	8	92
180	5	5	97
256	3	3	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16=	N/A 1/
D50=	20.5
D84=	90.0
SORT=	N/A 1/

Site Averages	
Mean D16=	10.0
Mean D50=	29.8
MeanD84=	89.0
Mean SORT=	2.8

1/ Value cannot be calculated.

ROCK CREEK

WOLMAN DATA
Sample Date: 11/5/01

RC2 Rock Creek

Transect # 1-4 Clay=3/61

Substrate Size (mm)	count	% total	% passing
<2	61	61	61
2	0	0	61
2.8	0	0	61
4	1	1	62
5.6	2	2	64
8	2	2	66
11	7	7	73
16	5	5	78
22	6	6	84
32	2	2	86
45	0	0	86
64	1	1	87
90	5	5	92
128	6	6	98
180	2	2	100
256	0	0	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16= N/A 1/
D50= N/A 1/
D84= 22.0
SORT= N/A 1/

Transect # 5-8 Clay=9/37

Substrate Size (mm)	count	% total	% passing
<2	37	37	37
2	0	0	37
2.8	0	0	37
4	0	0	37
5.6	1	1	38
8	3	3	41
11	1	1	42
16	5	5	47
22	3	3	50
32	6	6	56
45	2	2	58
64	6	6	64
90	16	16	80
128	11	11	91
180	5	5	96
256	2	2	98
360	2	2	100
512	0	0	100
TOTAL	100	100	

D16= N/A 1/
D50= 22.0
D84= 103.8
SORT= N/A 1/

Transect # 9-12 Clay=5/56

Substrate Size (mm)	count	% total	% passing
<2	56	56	56
2	3	3	59
2.8	0	0	59
4	1	1	60
5.6	0	0	60
8	1	1	61
11	1	1	62
16	1	1	63
22	4	4	67
32	2	2	69
45	4	4	73
64	6	6	79
90	7	7	86
128	8	8	94
180	5	5	99
256	1	1	100
360	0	0	100
512	0	0	100
TOTAL	100	100	

D16= N/A 1/
D50= N/A 1/
D84= 82.6
SORT= N/A 1/

Site Averages

Mean D16=	N/A 1/
Mean D50=	22.0
Mean D84=	69.5
Mean SORT=	N/A 1/

1/ Value cannot be calculated.

RC3 (Continued)

Site Averages	
Mean D16=	15.0
Mean D50=	42.5
MeanD84=	95.3
Mean SORT=	2.6

APPENDIX C

MACROINVERTEBRATE SPECIES LIST AND SITE OCCURRENCE, 2001-2002

TABLE C-1

LIST OF MACROINVERTEBRATE SPECIES AND THEIR OCCURRENCE AT STUDY SITES IN WALNUT, WOMAN, AND ROCK CREEKS AT ROCKY FLATS, 2001 AND 2002

	Walnut Creek					Woman Creek			Rock Creek			
Taxon	WC1	WC2	WC3	WC4	WC5	WO1	WO2	WO3	RC1	RCIM	RC2	RC3
TURBELLARIA												
Planariidae												
Dugesia sp.	x					x		x	x	x	x	x
NEMATODA				x	x				x			
OLIGOCHAETA												
Enchytraeidae	x	x	x	x	x	x		x	x	x		x
Lumbricidae	x	x	x	x	x	x	x	x		x		x
Naididae							x					
Dero (Dero) nivea	x		x		x	x	x				x	x
Nais bretscheri/pardalis						x						
Nais communis	x	x	x		x	x	x	x	x	x	x	x
Nais elinguis							x					
Nais simplex							x					
Nais variabilis	x		x	x	x	x						
Pristina aequiseta			x			x						x
Pristinella sp.							x					
Slavina appendiculata										x	x	
Tubificidae												
Aulodrilus pigueti							x				x	x
Tubificidae with hair chaetae	x	x	x	x	x	x	x	x	x	x	x	x
Tubificidae without hair chaetae	x	x	x	x	x	x	x	x	x	x	x	x
HIRUDINEA												
Erpobdellidae		x	x		x	x	x		x	x	x	
Mooreobdella fervida			x		x				x		x	x
Mooreobdella microstoma						x					x	
Glossiphoniidae												
Helobdella stagnalis		x			x	x	x		x	x		x
Hirudinidae												
Haemopis marmorata	x										x	
AMPHIPODA												
Gammaridae												
Crangonyx sp.						x	x	x				
Hyalellidae												
Hyalella azteca	x	x	x		x	x	x		x	x	x	x
DECAPODA												
Cambaridae												
Orconectes sp.	x		x				x				x	x
ACARI									x			
Arrenuridae												
Arrenurus sp.									x	x		
Hygrobatidae												
Hygrobates sp.	x					x				x	x	
Lebertiidae												
Lebertia sp.									x	x		
Limnocharidae												
Limnochares sp.			x									
Sperchonidae												
Sperchon sp.			x								x	
COLLEMBOLA	x		x	x		x	x	x	x	x	x	

TABLE C-1

Taxon	Walnut Creek					Woman Creek			Rock Creek			
	WC1	WC2	WC3	WC4	WC5	WO1	WO2	WO3	RC1	RCIM	RC2	RC3
EPHEMEROPTERA												
Baetidae												
Acentrella insignificans			x									
Baetis flavistriga			x				x					
Baetis magnus			x			x			x			
Baetis notos			x									
Baetis sp.							x					
Baetis tricaudatus	x		x	x		x			x		x	x
Callibaetis sp.	x	x	x	x	x	x				x	x	x
Centroptilum sp.								x				
Fallceon quilleri	x		x	x	x	x			x	x	x	x
Caenidae												
Caenis bajaensis	x		x			x	x		x	x	x	x
Leptohyphidae												
Tricorythodes minutus	x		x								x	
Leptophlebiidae												
Leptophlebia sp.						x			x	x	x	
ODONATA												
Aeshnidae												
Aeshna sp.	x	x	x		x	x	x				x	
Coenagrionidae	x	x	x			x	x	x		x	x	x
Amphiagrion abbreviatum						x			x	x		
Argia sp.	x	x	x			x	x		x	x	x	
Enallagma sp.		x	x									
Ischnura sp.		x	x			x	x				x	
Corduliidae												x
Lestidae												
Archilestes grandis	x	x	x			x						
Libellulidae					x							
PLECOPTERA												
Capniidae												
Capnura wanica						x		x				x
Nemouridae												
Malenka sp.												x
HEMIPTERA												
Corixidae				x	x							
Corisella inscripta			x		x							
Corisella tarsalis			x		x							
Sigara alternata					x							
Sigara grossolineata								x			x	
Trichocorixa borealis				x	x							
Gerridae	x											
Aquarius remigis	x	x				x						
Limnoporus notabilis		x										
Macroveliidae												
Macrovelia hornii									x			
Notonectidae												
Notonecta kirbyi		x			x			x			x	
Notonecta undulata		x						x				x
Veliidae												
Microvelia cerifera			x						x		x	
Microvelia sp.			x						x		x	

TABLE C-1

Taxon	Walnut Creek					Woman Creek			Rock Creek			
	WC1	WC2	WC3	WC4	WC5	WO1	WO2	WO3	RC1	RCIM	RC2	RC3
TRICHOPTERA												
Helicopsychidae												
Helicopsyche borealis						x						
Hydropsychidae												
Cheumatopsyche sp.			x	x		x	x			x	x	
Hydropsyche sp.			x			x						x
Hydroptilidae												
Hydroptila sp.			x			x	x		x	x	x	
Ochrotrichia sp.									x		x	x
Lepidostomatidae												
Lepidostoma sp.									x	x		
Limnephilidae			x	x	x	x	x		x		x	x
Hesperophylax sp.						x	x		x			x
Limnephilus sp.	x	x				x	x		x	x	x	x
COLEOPTERA												
Carabidae					x							
Dytiscidae												
Agabus disintegratus								x				
Agabus griseipennis						x						
Agabus minnesotensis							x					
Agabus semivittatus	x			x		x	x					x
Agabus seriatus												x
Agabus sp.	x	x	x			x	x	x		x	x	x
Colymbetinae	x	x	x	x	x	x	x	x		x		x
Hydroporinae	x	x			x	x	x	x		x	x	x
Hydroporus sp.												x
Ilybius fraterculus							x					
Laccophilus maculosus decipiens							x	x				
Laccophilus proximus								x				
Liodessus abjectus								x		x		
Liodessus obscurellus		x										x
Neoporus dimidiatus	x		x				x					
Rhantus gutticollis										x	x	x
Sanfilippodytes sp.							x	x				x
Stictotarsus striatellus		x										
Elmidae												
Dubiraphia sp.							x					
Optioservus sp.	x					x	x				x	x
Zaitzevia parvula						x						
Haliplidae												
Haliplus immaculicollis		x					x	x			x	x
Haliplus sp.	x	x					x			x	x	x
Peltodytes edentulus			x									
Peltodytes sp.										x		
Helophoridae												
Helophorus lacustris				x				x			x	x
Hydraenidae												
Gymnochthebius falli		x			x			x			x	x
Hydraena sp.										x		
Ochthebius sp.		x	x		x						x	

TABLE C-1

Taxon	Walnut Creek					Woman Creek			Rock Creek			
	WC1	WC2	WC3	WC4	WC5	WO1	WO2	WO3	RC1	RCIM	RC2	RC3
COLEOPTERA (Continued)												
Hydrophilidae												
Anacaena sp.		x				x			x	x	x	x
Berosus fraternus								x				
Berosus peregrinus		x										
Cymbiodyta sp.	x	x				x			x	x		
Enochrus ochraceous		x									x	
Hydrobius fuscipes								x				
Laccobius sp.	x		x						x		x	
Paracymus sp.		x	x	x					x		x	x
Tropisternus columbianus		x								x		
Tropisternus lateralis nimbatus				x	x						x	
Tropisternus sublaevis		x		x	x			x	x		x	x
Tropisternus sp.				x	x					x		
DIPTERA												
Ceratopogonidae	x	x	x	x	x	x	x		x	x	x	x
Atrichopogon sp.									x			
Dasyhelea sp.	x				x	x			x		x	x
Chironomidae												
Acricotopus sp.		x						x		x		x
Alotanypus sp.		x										
Apedilum sp.		x					x	x			x	x
Brillia sp.	x	x	x			x	x	x	x		x	x
Chaetocladius sp.	x	x				x		x	x	x	x	x
Chironomus sp.	x	x	x	x	x		x	x		x	x	x
Corynoneura sp.	x	x	x	x	x	x	x	x		x	x	x
Cricotopus sp.	x	x	x		x	x	x	x	x	x	x	x
Cryptochironomus sp.	x	x	x	x	x	x					x	x
Diamesa sp.		x		x	x			x			x	x
Dicrotendipes sp.		x	x	x	x	x	x			x	x	x
Eukiefferiella sp.			x			x	x	x		x	x	x
Glyptotendipes sp.				x								
Heleniella sp.	x					x			x	x	x	x
Heterotrissocladius sp.	x					x				x	x	x
Hydrobaenus sp.	x			x	x		x	x		x		x
Larsia sp.						x			x	x		
Lauterborniella sp.											x	
Limnophyes sp.	x	x	x	x	x	x	x	x		x	x	x
Metriocnemus sp.		x						x		x		x
Micropsectra sp.	x	x	x	x	x	x	x	x	x	x	x	x
Nanocladius sp.			x								x	
Nilotanypus sp.	x	x				x			x	x	x	x
Odontomesa sp.	x					x	x	x	x	x	x	x
Orthocladiinae	x											
Orthocladius sp.						x		x		x	x	
Pagastia sp.			x				x	x		x	x	x
Paramerina sp.	x	x	x			x	x			x	x	x
Parametriocnemus sp.			x	x		x	x				x	x
Paraphaenocladius sp.	x	x		x	x	x			x			x
Paratanytarsus sp.	x	x	x	x	x	x	x			x	x	x
Paratendipes sp.	x	x	x		x	x	x		x	x	x	x
Parochlus sp.							x	x				x
Phaenopsectra sp.	x	x		x	x	x	x	x			x	x
Polypedilum sp.	x	x		x	x	x	x	x	x	x	x	x
Procladius sp.					x	x	x				x	x
Psectrocladius sp.						x		x				x
Pseudochironomus sp.						x					x	

TABLE C-1

Taxon	Walnut Creek WC1	WC2	WC3	WC4	WC5	Woman Creek WO1	WO2	WO3	Rock Creek RC1	RCIM	RC2	RC3
DIPTERA												
Chironomidae (Continued)												
Pseudodiamesa sp.			x		x							x
Pseudosmittia sp.	x			x	x			x	x		x	x
Radotanypus submarginella	x	x			x	x	x		x	x	x	x
Rheocricotopus sp.			x	x	x	x	x				x	x
Rheotanytarsus sp.			x									
Smittia sp.					x							
Stictochironomus sp.	x		x								x	x
Tanypus sp.					x		x					
Tanytarsus sp.	x	x	x			x	x		x	x	x	x
Thienemanniella sp.	x	x	x	x		x			x		x	x
Thienemannimyia group	x	x	x		x	x	x		x	x	x	x
Tvetenia sp.	x		x				x	x	x		x	x
Culicidae											x	x
Aedes sp.					x							
Culex sp.					x							
Culiseta sp.												x
Dixidae						x					x	
Dixa sp.								x				x
Dixella sp.		x				x			x		x	x
Dolichopodidae				x					x			x
Empididae	x	x	x			x			x			x
Clinocera sp.												x
Hemerodromia sp.	x		x						x		x	
Ephydridae		x							x			x
Muscidae												
Limnophora sp.		x	x	x				x				x
Psychodidae												
Maruina sp.									x			
Pericoma sp.	x	x		x					x	x		
Ptychopteridae												
Bittacomorpha sp.									x	x		
Ptychoptera sp.						x			x		x	
Sciomyzidae		x										
Simuliidae												
Simulium decorum			x									
Simulium vittatum complex	x	x	x	x	x	x	x	x	x	x	x	x
Simulium sp.											x	x
Stratiomyidae												
Caloparyphus sp.		x	x		x				x	x	x	
Euparyphus sp.		x										
Nemotelus sp.	x											
Tabanidae							x					
Tipulidae		x							x		x	
Dicranota sp.												x
Helius sp.											x	
Limnophila sp.	x											
Limonia sp.									x		x	
Pedicia sp.									x			x
Pilaria sp.						x			x	x		
Pseudolimnophila sp.	x								x		x	
Tipula sp.	x	x				x	x	x	x			

TABLE C-1

Taxon	Walnut Creek WC1	WC2	WC3	WC4	WC5	Woman Creek WO1	WO2	WO3	Rock Creek RC1	RCIM	RC2	RC3
GASTROPODA												
Lymnaeidae	x	x	x	x	x	x	x	x	x		x	x
Fossaria bulimoides								x				
Fossaria obrussa	x						x	x				
Stagnicola caperata		x		x	x			x				
Physidae												
Physa sp.	x	x	x	x	x	x	x		x	x	x	x
Planorbidae	x			x	x	x			x		x	x
Gyraulus sp.					x		x					x
BIVALVIA												
Sphaeriidae												
Pisidium sp.	x	x	x			x	x		x	x	x	

TOTAL NUMBER OF TAXA COLLECTED				all drainages
Summer 2001	96 (24-48) *	61 (34,45)	88 (42-54)	140
Fall 2001	81 (25-37)	70 (14-48)	80 (29-52)	122
Spring 2002	67 (29-45)	87 (43-45)	93 (38-61)	136
Summer 2002	55 (24-30)	32 (20,22)	55 (19-33)	95
Fall 2002	78 (3-43)	45 (6-32)	89 (32-50)	126

* numbers in parenthesis represent range of taxa for individual sites.

APPENDIX D

2001 MACROINVERTEBRATE COMMUNITY DATA

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2001

DENSITY

Density by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0	0	0	0	0
NEMATODA	0	0	0	0	0
OLIGOCHAETA	3	21	6	48	12326
HIRUDINEA	1	11	11	0	29
AMPHIPODA	169	1180	63	0	110
DECAPODA	3	0	2	0	0
ACARI	0	0	2	0	0
COLEMBOLA	1	0	0	4	0
EPHEMEROPTERA	16	70	189	114	338
ODONATA	26	308	15	0	29
PLECOPTERA	0	0	0	0	0
HEMIPTERA	2	13	0	23	500
TRICHOPTERA	0	0	116	2	0
COLEOPTERA	6	51	0	8	132
DIPTERA	33	976	263	2341	1294
GASTROPODA	4	179	6	8	3440
BIVALVIA	0	8	0	0	0
Total	264	2817	674	2550	18199

Density by Order	WO1	WO2	WO3	RC1	RC2	RC3
TURBELLARIA	0	0		22	84	0
NEMATODA	0	0	dry	0	0	0
OLIGOCHAETA	336	296		330	918	547
HIRUDINEA	12	12		6	17	2
AMPHIPODA	186	414		340	2080	11
DECAPODA	0	2		0	2	2
ACARI	0	0		0	0	0
COLEMBOLA	0	0		2	8	0
EPHEMEROPTERA	292	4		152	701	0
ODONATA	82	6		32	272	4
PLECOPTERA	0	0		0	0	0
HEMIPTERA	6	0		0	0	0
TRICHOPTERA	56	2		54	177	2
COLEOPTERA	10	4		20	109	80
DIPTERA	204	118		668	2426	307
GASTROPODA	98	86		218	93	558
BIVALVIA	34	2		6	42	0
Total	1316	946		1850	6929	1514

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2001

RELATIVE ABUNDANCE

Relative Abundance by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0.00	0.00	0.00	0.00	0.00
NEMATODA	0.00	0.00	0.00	0.00	0.00
OLIGOCHAETA	1.14	0.76	0.94	1.90	67.73
HIRUDINEA	0.38	0.38	1.56	0.00	0.16
AMPHIPODA	64.02	41.88	9.38	0.00	0.61
DECAPODA	1.14	0.00	0.31	0.00	0.00
ACARI	0.00	0.00	0.31	0.00	0.00
COLEMBOLA	0.38	0.00	0.00	0.17	0.00
EPHEMEROPTERA	6.06	2.47	28.13	4.46	1.86
ODONATA	9.85	10.92	2.19	0.00	0.16
PLECOPTERA	0.00	0.00	0.00	0.00	0.00
HEMIPTERA	0.76	0.47	0.00	0.91	2.75
TRICHOPTERA	0.00	0.00	17.19	0.08	0.00
COLEOPTERA	2.27	1.80	0.00	0.33	0.73
DIPTERA	12.50	34.66	39.06	91.82	7.11
GASTROPODA	1.52	6.36	0.94	0.33	18.90
BIVALVIA	0.00	0.28	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00

Relative Abundance by Order	WO1	WO2	WO3	RC1	RC2	RC3
TURBELLARIA	0.00	0.00		1.19	1.22	0.00
NEMATODA	0.00	0.00	dry	0.00	0.00	0.00
OLIGOCHAETA	25.53	31.29		17.84	13.25	36.16
HIRUDINEA	0.91	1.27		0.32	0.24	0.14
AMPHIPODA	14.13	43.76		18.38	30.02	0.70
DECAPODA	0.00	0.21		0.00	0.03	0.14
ACARI	0.00	0.00		0.00	0.00	0.00
COLEMBOLA	0.00	0.00		0.11	0.12	0.00
EPHEMEROPTERA	22.19	0.42		8.22	10.12	0.00
ODONATA	6.23	0.63		1.73	3.92	0.28
PLECOPTERA	0.00	0.00		0.00	0.00	0.00
HEMIPTERA	0.46	0.00		0.00	0.00	0.00
TRICHOPTERA	4.26	0.21		2.92	2.55	0.14
COLEOPTERA	0.76	0.42		1.08	1.58	5.29
DIPTERA	15.50	12.47		36.11	35.00	20.31
GASTROPODA	7.45	9.09		11.78	1.34	36.86
BIVALVIA	2.58	0.21		0.32	0.61	0.00
Total	100.00	100.00		100.00	100.00	100.00

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2001

COMMUNITY PARAMETERS

	WC1	WC2	WC3	WC4	WC5
Total Density (N/m^2)	264	2817	674	2550	18199
Diversity (d)	2.28	3.33	3.46	2.69	2.88
Total Number of Taxa	24	43	30	34	48
% Dominant Taxon	64.02	41.88	22.50	54.00	45.15
EPT Richness	3	1	8	3	2
EPT abundance	16.00	69.55	305.30	115.80	338.10
Chironomid abundance	13.00	957.65	172.65	2156.03	977.55
Ratio of EPT to Chironomids	1.23	0.07	1.77	0.05	0.35
Scraper abundance	4.00	205.98	8.42	92.64	3469.20
Filterer abundance	18.00	34.78	204.23	183.18	235.20
Ratio of Scrapers to Filterers	0.22	5.92	0.04	0.51	14.75
Shredder abundance	4.00	77.58	122.12	122.12	352.80
Ratio of Shredders to Total	0.02	0.03	0.18	0.05	0.02
HBI	7.40	7.75	6.08	8.59	9.45
ICI	22	18	32	16	14

	WO1	WO2	WO3	RC1	RC2	RC3
Total Density (N/m^2)	1316	946		1850	6929	1514
Diversity (d)	4.11	3.21	dry	3.90	3.72	3.47
Total Number of Taxa	45	34		46	54	42
% Dominant Taxon	20.82	42.71		18.38	30.02	32.13
EPT Richness	6	2		5	6	1
EPT abundance	348.00	6.00		206.00	877.99	2.11
Chironomid abundance	174.00	90.00		320.00	2290.78	77.90
Ratio of EPT to Chironomids	2.00	0.07		0.64	0.38	0.03
Scraper abundance	144.00	92.00		220.00	151.60	560.06
Filterer abundance	64.00	2.00		308.00	185.28	2.11
Ratio of Scrapers to Filterers	2.25	46.00		0.71	0.82	266.00
Shredder abundance	24.00	4.00		26.00	33.69	4.21
Ratio of Shredders to Total	0.02	0.00		0.01	0.00	0.00
HBI	7.50	8.03		7.10	7.26	8.15
ICI	14	10		20	20	20

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2001

DENSITY

Density by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0	0	0	0	0
NEMATODA	0	0	0	433	185
OLIGOCHAETA	12	0	280	3131	404
HIRUDINEA	0	0	5	0	8
AMPHIPODA	282	1321	316	0	8
DECAPODA	2	0	0	0	0
ACARI	6	0	0	0	0
COLEMBOLA	12	0	0	0	0
EPHEMEROPTERA	18	1334	2080	33	17
ODONATA	210	330	44	0	0
PLECOPTERA	0	0	0	0	0
HEMIPTERA	0	0	12	100	17
TRICHOPTERA	120	191	1028	455	8
COLEOPTERA	78	114	8	89	42
DIPTERA	1026	851	624	744	657
GASTROPODA	114	2718	68	2986	1263
BIVALVIA	6	38	0	0	0
Total	1886	6896	4465	7971	2611

Density by Order	WO1	WO2	WO3	RC1	RC2	RC3
TURBELLARIA	0	0	0	96	322	39
NEMATODA	0	0	0	0	0	0
OLIGOCHAETA	1543	1232	1668	440	244	951
HIRUDINEA	11	0	0	8	22	10
AMPHIPODA	100	844	8	272	411	19
DECAPODA	0	3	0	0	0	0
ACARI	22	0	0	0	11	0
COLEMBOLA	0	0	0	0	0	0
EPHEMEROPTERA	3608	144	0	192	1932	281
ODONATA	155	100	0	72	89	0
PLECOPTERA	11	0	51	0	0	3270
HEMIPTERA	0	0	17	0	33	0
TRICHOPTERA	89	44	0	40	222	466
COLEOPTERA	78	111	84	24	355	204
DIPTERA	3275	1377	522	376	1688	5550
GASTROPODA	300	167	34	896	11	407
BIVALVIA	44	0	0	40	22	0
Total	9237	4022	2383	2456	5362	11196

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2001

RELATIVE ABUNDANCE

Relative Abundance by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0.00	0.00	0.00	0.00	0.00
NEMATODA	0.00	0.00	0.00	5.43	7.10
OLIGOCHAETA	0.64	0.00	6.27	39.28	15.48
HIRUDINEA	0.00	0.00	0.11	0.00	0.32
AMPHIPODA	14.96	19.15	7.08	0.00	0.32
DECAPODA	0.08	0.00	0.00	0.00	0.00
ACARI	0.32	0.00	0.00	0.00	0.00
COLEMBOLA	0.64	0.00	0.00	0.00	0.00
EPHEMEROPTERA	0.95	19.34	46.58	0.42	0.65
ODONATA	11.14	4.79	0.99	0.00	0.00
PLECOPTERA	0.00	0.00	0.00	0.00	0.00
HEMIPTERA	0.00	0.00	0.27	1.25	0.65
TRICHOPTERA	6.36	2.76	23.02	5.71	0.32
COLEOPTERA	4.14	1.66	0.18	1.11	1.61
DIPTERA	54.42	12.34	13.98	9.33	25.16
GASTROPODA	6.05	39.41	1.52	37.47	48.39
BIVALVIA	0.32	0.55	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00

Relative Abundance by Order	WO1	WO2	WO3	RC1	RC2	RC3
TURBELLARIA	0.00	0.00	0.00	3.91	6.00	0.35
NEMATODA	0.00	0.00	0.00	0.00	0.00	0.00
OLIGOCHAETA	16.71	30.64	69.96	17.92	4.55	8.49
HIRUDINEA	0.12	0.00	0.00	0.33	0.41	0.09
AMPHIPODA	1.08	20.98	0.35	11.07	7.66	0.17
DECAPODA	0.00	0.07	0.00	0.00	0.00	0.00
ACARI	0.24	0.00	0.00	0.00	0.21	0.00
COLEMBOLA	0.00	0.00	0.00	0.00	0.00	0.00
EPHEMEROPTERA	39.06	3.59	0.00	7.82	36.02	2.51
ODONATA	1.68	2.48	0.00	2.93	1.66	0.00
PLECOPTERA	0.12	0.00	2.12	0.00	0.00	29.20
HEMIPTERA	0.00	0.00	0.71	0.00	0.62	0.00
TRICHOPTERA	0.96	1.10	0.00	1.63	4.14	4.16
COLEOPTERA	0.84	2.76	3.53	0.98	6.63	1.82
DIPTERA	35.46	34.23	21.91	15.31	31.47	49.57
GASTROPODA	3.25	4.14	1.41	36.48	0.21	3.64
BIVALVIA	0.48	0.00	0.00	1.63	0.41	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2001

COMMUNITY PARAMETERS

	WC1	WC2	WC3	WC4	WC5
Total Density (N/m^2)	1886	6896	4465	7971	2611
Diversity (d)	3.98	2.95	3.12	3.30	3.29
Total Number of Taxa	35	25	37	29	30
% Dominant Taxon	16.23	36.10	42.28	33.15	35.48
EPT Richness	4	2	7	3	2
EPT abundance	138.00	1524.00	3108.00	488.49	25.27
Chironomid abundance	936.00	850.90	380.00	666.12	648.49
Ratio of EPT to Chironomids	0.15	1.79	8.18	0.73	0.04
Scraper abundance	192.00	2717.80	140.00	2986.44	1280.14
Filterer abundance	42.00	38.10	1180.00	0.00	0.00
Ratio of Scrapers to Filterers	4.57	71.33	0.12	n/a	n/a
Shredder abundance	246.00	215.90	72.00	488.49	8.42
Ratio of Shredders to Total	0.13	0.03	0.02	0.06	0.00
HBI	6.92	7.89	5.73	8.06	7.43
ICI	20	14	38	16	14

	WO1	WO2	WO3	RC1	RC2	RC3
Total Density (N/m^2)	9237	4022	2383	2456	5362	11196
Diversity (d)	3.71	4.04	1.79	3.29	3.71	3.68
Total Number of Taxa	48	39	14	29	44	52
% Dominant Taxon	36.42	21.53	67.49	36.48	24.22	29.20
EPT Richness	8	3	1	6	8	7
EPT abundance	3708.07	188.73	50.53	232.00	2153.79	4016.63
Chironomid abundance	2764.40	999.18	522.16	216.00	244.24	4647.26
Ratio of EPT to Chironomids	1.34	0.19	0.10	1.07	8.82	0.86
Scraper abundance	455.18	177.63	33.69	904.00	177.63	1076.92
Filterer abundance	155.43	444.08	0.00	224.00	1498.77	863.48
Ratio of Scrapers to Filterers	2.93	0.40	n/a	4.04	0.12	1.25
Shredder abundance	555.10	177.63	50.53	56.00	33.31	3939.01
Ratio of Shredders to Total	0.06	0.04	0.02	0.02	0.01	0.35
HBI	7.10	7.72	8.75	7.65	5.79	5.26
ICI	40	20	2	22	40	38

WC1

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	1	1.00	0.38
Lumbricidae	2	2.00	0.76
Naididae (undetermined)			
Nais communis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata	1	1.00	0.38
Helobdella stagnalis			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	169	169.00	64.02
DECAPODA			
Orconectes sp.	3	3.00	1.14
ACARI			
Limnochares sp.			
COLLEMBOLA	1	1.00	0.38
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	6	6.00	2.27
Caenis bajaensis			
Callibaetis sp.	1	1.00	0.38
Fallceon quilleri	9	9.00	3.41
Leptophlebia sp.			
ODONATA			
Aeshna sp.			
Archilestes grandis	4	4.00	1.52
Argia sp.	21	21.00	7.95
Coenagrionidae	1	1.00	0.38
Corduliidae			
Enallagma sp.			
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis	2	2.00	0.76
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult	5	5.00	1.89
Agabus seriatus adult			
Anacaena sp. adult			
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult			
Neoporus dimidiatus adult	1	1.00	0.38
Optioservus sp. adult and larvae			
Paracymus sp. adult			
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.	2	2.00	0.76
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.	1	1.00	0.38
Cryptochironomus sp.	1	1.00	0.38
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.			
Helius sp.			

WC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterbomiella sp.			
Limnophyes sp.			
Limonia sp.			
Maruina sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.	7	7.00	2.65
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Pedicia sp.			
Pericoma sp.	1	1.00	0.38
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	18	18.00	6.82
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	2	2.00	0.76
Tipula sp.	1	1.00	0.38
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	4	4.00	1.52
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	264	264.00	100.00

Total Density (N/m^2)	264
Total Number of Taxa	24
Diversity (d)	2.28

WALNUT CREEK
WC1

Community Parameters	Kick Sample
Total Density (N/m^2)	264
Diversity (d)	2.28
Total Number of Taxa	24
% Dominant Taxon	64.02
EPT Richness 3/0/0	3
EPT (abundance)	16.00
Chiron (abundance)	13.00
EPT/Chironomid ratio	1.23
Scraper (abundance)	4.00
Filterer (abundance)	18.00
SC/F ratio	0.22
Shredder (abundance)	4.00
SH/Total ratio	0.02
HBI	7.40
ICI	22

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	1.14
HIRUDINEA	0.38
AMPHIPODA	64.02
DECAPODA	1.14
ACARI	0.00
COLEMBOLA	0.38
EPHEMEROPTERA	6.06
ODONATA	9.85
PLECOPTERA	0
HEMIPTERA	0.76
TRICHOPTERA	0.00
COLEOPTERA	2.27
DIPTERA	12.50
GASTROPODA	1.52
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	3
HIRUDINEA	1
AMPHIPODA	169
DECAPODA	3
ACARI	0
COLEMBOLA	1
EPHEMEROPTERA	16
ODONATA	26
PLECOPTERA	0
HEMIPTERA	2
TRICHOPTERA	0
COLEOPTERA	6
DIPTERA	33
GASTROPODA	4
BIVALVIA	0
Totals:	264

WC2

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	4	10.70	0.38
Naididae (undetermined)			
Nais communis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	1	2.68	0.09
Tubificidae without hair chaetae	3	8.03	0.28
HIRUDINEA			
Erpobdellidae	4	10.70	0.38
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	441	1179.68	41.88
DECAPODA			
Orconectes sp.			
ACARI			
Limnochares sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	26	69.55	2.47
Fallceon quilleri			
Leptophlebia sp.			
ODONATA			
Aeshna sp.	9	24.08	0.85
Archilestes grandis	34	90.95	3.23
Argia sp.	14	37.45	1.33
Coenagrionidae	21	56.18	1.99
Corduliidae			
Enallagma sp.	37	98.98	3.51
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi	3	8.03	0.28
Notonecta undulata	2	5.35	0.19
Sigara alternata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult	6	16.05	0.57
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult	2	5.35	0.19
Enochrus ochraceous adult			
Haliplus immaculicollis adult	2	5.35	0.19
Haliplus sp. larvae	2	5.35	0.19
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult	1	2.68	0.09
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult			
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult	4	10.70	0.38
Tropisternus sp. larvae			
Tropisternus sublaevis adult	2	5.35	0.19
DIPTERA			
Aedes sp.			
Apedilum sp.	9	24.08	0.85
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	2	5.35	0.19
Corynoneura sp.	2	5.35	0.19
Cricotopus sp.	28	74.90	2.66
Cryptochironomus sp.	1	2.68	0.09
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	157	419.98	14.91
Dixella sp.	1	2.68	0.09
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.			
Helius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterbomiella sp.			
Limnophyes sp.	6	16.05	0.57
Limonia sp.			
Maruina sp.			
Micropsectra sp.	18	48.15	1.71
Nanocladius sp.			
Nilotanypus sp.			
Paramerina sp.	16	42.80	1.52
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	74	197.95	7.03
Paratendipes sp.	16	42.80	1.52
Pedicia sp.			
Periçoma sp.			
Phaenopsectra sp.	10	26.75	0.95
Polypedilum sp.	1	2.68	0.09
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	8	21.40	0.76
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae	1	2.68	0.09
Simulium decorum			
Simulium vittatum complex	5	13.38	0.47
Tabanidae			
Tanypus sp.			
Tanytarsus sp.	5	13.38	0.47
Thienemanniella sp.	1	2.68	0.09
Thienemannimyia group	4	10.70	0.38
Tipula sp.			
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	64	171.20	6.08
Planorbidae			
Stagnicola caperata	3	8.03	0.28
BIVALVIA			
Pisidium sp.	3	8.03	0.28
Totals:	1053	2816.78	100.00

Total Density (N/m^2)	2817
Total Number of Taxa	43
Diversity (d)	3.33

Community Parameters	Kick Sample
Total Density (N/m^2)	2817
Diversity (d)	3.33
Total Number of Taxa	43
% Dominant Taxon	41.88
EPT Richness 1/0/0	1
EPT (abundance)	69.55
Chiron (abundance)	957.65
EPT/Chironomid ratio	0.07
Scraper (abundance)	205.98
Filterer (abundance)	34.78
SC/F ratio	5.92
Shredder (abundance)	77.58
SH/Total ratio	0.03
HBI	7.75
ICI	18

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	0.76
HIRUDINEA	0.38
AMPHIPODA	41.88
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	2.47
ODONATA	10.92
PLECOPTERA	0
HEMIPTERA	0.47
TRICHOPTERA	0.00
COLEOPTERA	1.80
DIPTERA	34.66
GASTROPODA	6.36
BIVALVIA	0.28
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	21
HIRUDINEA	11
AMPHIPODA	1180
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	70
ODONATA	308
PLECOPTERA	0
HEMIPTERA	13
TRICHOPTERA	0
COLEOPTERA	51
DIPTERA	976
GASTROPODA	179
BIVALVIA	8
Totals:	2817

WC3

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	2	4.21	0.63
Naididae (undetermined)			
Nais communis			
Nais simplex			
Nais variabilis	1	2.11	0.31
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	5	10.53	1.56
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	30	63.17	9.38
DECAPODA			
Orconectes sp.	1	2.11	0.31
ACARI			
Limnochares sp.	1	2.11	0.31
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans	2	4.21	0.63
Baetis magnus	3	6.32	0.94
Baetis notos	4	8.42	1.25
Baetis tricaudatus	72	151.60	22.50
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri	9	18.95	2.81
Leptophlebia sp.			
ODONATA			
Aeshna sp.			
Archilestes grandis			
Argia sp.	4	8.42	1.25
Coenagrionidae	2	4.21	0.63
Corduliidae			
Enallagma sp.			
Ischnura sp.	1	2.11	0.31
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

WC3

Community Parameters	Kick Sample
Total Density (N/m^2)	674
Diversity (d)	3.46
Total Number of Taxa	30
% Dominant Taxon	22.50
EPT Richness 5/0/3	8
EPT (abundance)	305.30
Chiron (abundance)	172.65
EPT/Chironomid ratio	1.77
Scraper (abundance)	8.42
Filterer (abundance)	204.23
SC/F ratio	0.04
Shredder (abundance)	122.12
SH/Total ratio	0.18
HBI	6.08
ICI	32

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	0.94
HIRUDINEA	1.56
AMPHIPODA	9.38
DECAPODA	0.31
ACARI	0.31
COLEMBOLA	0.00
EPHEMEROPTERA	28.13
ODONATA	2.19
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	17.19
COLEOPTERA	0.00
DIPTERA	39.06
GASTROPODA	0.94
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	6
HIRUDINEA	11
AMPHIPODA	63
DECAPODA	2
ACARI	2
COLEMBOLA	0
EPHEMEROPTERA	189
ODONATA	15
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	116
COLEOPTERA	0
DIPTERA	263
GASTROPODA	6
BIVALVIA	0
Totals:	674

WC4 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	1	2.11	0.08
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult			
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult	3	6.32	0.25
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae	1	2.11	0.08
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	2	4.21	0.17
Chaetocladius sp.			
Chironomus sp.	654	1377.00	54.00
Corynoneura sp.	2	4.21	0.17
Cricotopus sp.	42	88.43	3.47
Cryptochironomus sp.	1	2.11	0.08
Culex sp.			
Dasyhelea sp.			
Diamesa sp.	1	2.11	0.08
Dicrotendipes sp.	5	10.53	0.41
Dixella sp.			
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.	2	4.21	0.17
Heleniella sp.			
Helius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterborniella sp.			
Limnophyes sp.	19	40.00	1.57
Limonia sp.			
Maruina sp.			
Micropsectra sp.	95	200.02	7.84
Nanocladius sp.			
Nilotanypus sp.			
Paramerina sp.			
Parametriocnemus sp.	1	2.11	0.08
Paraphaenocladius sp.	1	2.11	0.08
Paratanytarsus sp.	13	27.37	1.07
Paratendipes sp.			
Pedicia sp.			
Pericoma sp.	2	4.21	0.17
Phaenopsectra sp.	40	84.22	3.30
Polypedilum sp.	16	33.69	1.32
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	53	111.59	4.38
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.	78	164.23	6.44
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	84	176.86	6.94
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.	1	2.11	0.08
Thienemannimyia group			
Tipula sp.			
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
Planorbidae	3	6.32	0.25
Stagnicola caperata	1	2.11	0.08
BIVALVIA			
Pisidium sp.			
Totals:	1211	2549.76	100.00

Total Density (N/m^2)	2550
Total Number of Taxa	34
Diversity (d)	2.69

WC4

Community Parameters	Kick Sample
Total Density (N/m^2)	2550
Diversity (d)	2.69
Total Number of Taxa	34
% Dominant Taxon	54.00
EPT Richness 2/0/1	3
EPT (abundance)	115.80
Chiron (abundance)	2156.03
EPT/Chironomid ratio	0.05
Scraper (abundance)	92.64
Filterer (abundance)	183.18
SC/F ratio	0.51
Shredder (abundance)	122.12
SH/Total ratio	0.05
HBI	8.59
ICI	16

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	1.90
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.17
EPHEMEROPTERA	4.46
ODONATA	0.00
PLECOPTERA	0
HEMIPTERA	0.91
TRICHOPTERA	0.08
COLEOPTERA	0.33
DIPTERA	91.82
GASTROPODA	0.33
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	48
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	4
EPHEMEROPTERA	114
ODONATA	0
PLECOPTERA	0
HEMIPTERA	23
TRICHOPTERA	2
COLEOPTERA	8
DIPTERA	2341
GASTROPODA	8
BIVALVIA	0
Totals:	2550

WC5

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea	188	345.45	1.90
Enchytraeidae			
Lumbricidae	376	690.90	3.80
Naididae (undetermined)			
Nais communis	20	36.75	0.20
Nais simplex			
Nais variabilis	28	51.45	0.28
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	4472	8217.30	45.15
Tubificidae without hair chaetae	1624	2984.10	16.40
HIRUDINEA			
Erpobdellidae	8	14.70	0.08
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	8	14.70	0.08
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	60	110.25	0.61
DECAPODA			
Orconectes sp.			
ACARI			
Limnochares sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	168	308.70	1.70
Fallceon quilleri	16	29.40	0.16
Leptophlebia sp.			
ODONATA			
Aeshna sp.	4	7.35	0.04
Archilestes grandis			
Argia sp.			
Coenagrionidae			
Corduliidae			
Enallagma sp.			
Ischnura sp.			
Libellulidae	12	22.05	0.12
HEMIPTERA			
Aquarius remigis			
Corixidae larvae	208	382.20	2.10
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata	4	7.35	0.04
Trichocorixa borealis	60	110.25	0.61

WC5 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult			
Carabidae larvae	8	14.70	0.08
Colymbetinae larvae	32	58.80	0.32
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	4	7.35	0.04
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult			
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae	24	44.10	0.24
Tropisternus sublaevis adult	4	7.35	0.04
DIPTERA			
Aedes sp.	4	7.35	0.04
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.	4	7.35	0.04
Ceratopogonidae	32	58.80	0.32
Chaetocladius sp.			
Chironomus sp.	60	110.25	0.61
Corynoneura sp.	28	51.45	0.28
Cricotopus sp.	164	301.35	1.66
Cryptochironomus sp.	12	22.05	0.12
Culex sp.	4	7.35	0.04
Dasyhelea sp.	8	14.70	0.08
Diamesa sp.			
Dicrotendipes sp.	16	29.40	0.16
Dixella sp.			
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.			
Helius sp.			

WC5 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterborniella sp.			
Limnophyes sp.	36	66.15	0.36
Limonia sp.			
Maruina sp.			
Micropsectra sp.	64	117.60	0.65
Nanocladius sp.			
Nilotanypus sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.	8	14.70	0.08
Paratanytarsus sp.	8	14.70	0.08
Paratendipes sp.			
Pedicia sp.			
Pericoma sp.			
Phaenopsectra sp.	16	29.40	0.16
Polypedilum sp.	28	51.45	0.28
Procladius sp.	36	66.15	0.36
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	4	7.35	0.04
Ptychoptera sp.			
Radotanypus submarginella	16	29.40	0.16
Rheocricotopus sp.	28	51.45	0.28
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	120	220.50	1.21
Tabanidae			
Tanypus sp.	4	7.35	0.04
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	4	7.35	0.04
Tipula sp.			
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.	4	7.35	0.04
Lymnaeidae			
Physa sp.	1100	2021.25	11.11
Planorbidae	4	7.35	0.04
Stagnicola caperata	764	1403.85	7.71
BIVALVIA			
Pisidium sp.			
Totals:	9904	18198.60	100.00

Total Density (N/m^2)	18199
Total Number of Taxa	48
Diversity (d)	2.88

Community Parameters	Kick Sample
Total Density (N/m^2)	18199
Diversity (d)	2.88
Total Number of Taxa	48
% Dominant Taxon	45.15
EPT Richness 2/0/0	2
EPT (abundance)	338.10
Chiron (abundance)	977.55
EPT/Chironomid ratio	0.35
Scraper (abundance)	3469.20
Filterer (abundance)	235.20
SC/F ratio	14.75
Shredder (abundance)	352.80
SH/Total ratio	0.02
HBI	9.45
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	67.73
HIRUDINEA	0.16
AMPHIPODA	0.61
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	1.86
ODONATA	0.16
PLECOPTERA	0
HEMIPTERA	2.75
TRICHOPTERA	0.00
COLEOPTERA	0.73
DIPTERA	7.11
GASTROPODA	18.90
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	12326
HIRUDINEA	29
AMPHIPODA	110
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	338
ODONATA	29
PLECOPTERA	0
HEMIPTERA	500
TRICHOPTERA	0
COLEOPTERA	132
DIPTERA	1294
GASTROPODA	3440
BIVALVIA	0
Totals:	18199

WO1

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	54	54.00	4.10
Naididae (undetermined)			
Nais communis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	8	8.00	0.61
Tubificidae without hair chaetae	274	274.00	20.82
HIRUDINEA			
Erpobdellidae	10	10.00	0.76
Haemopis marmorata			
Helobdella stagnalis	2	2.00	0.15
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	186	186.00	14.13
DECAPODA			
Orconectes sp.			
ACARI			
Limnochares sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	6	6.00	0.46
Caenis bajaensis	154	154.00	11.70
Callibaetis sp.			
Fallceon quilleri	110	110.00	8.36
Leptophlebia sp.	22	22.00	1.67
ODONATA			
Aeshna sp.	10	10.00	0.76
Archilestes grandis	4	4.00	0.30
Argia sp.	44	44.00	3.34
Coenagrionidae	24	24.00	1.82
Corduliidae			
Enallagma sp.			
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis	6	6.00	0.46
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

WO1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	28	28.00	2.13
Helicopsyche borealis	28	28.00	2.13
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult	2	2.00	0.15
Agabus semivittatus adult	2	2.00	0.15
Agabus seriatus adult			
Anacaena sp. adult	2	2.00	0.15
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult	2	2.00	0.15
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	2	2.00	0.15
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult			
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.	2	2.00	0.15
Caloparyphus sp.			
Ceratopogonidae	8	8.00	0.61
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.	8	8.00	0.61
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	4	4.00	0.30
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.	4	4.00	0.30
Helius sp.			

WO1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.	4	4.00	0.30
Lauterborniella sp.			
Limnophyes sp.			
Limonia sp.			
Maruina sp.			
Micropsectra sp.	6	6.00	0.46
Nanocladius sp.			
Nilotanypus sp.	18	18.00	1.37
Paramerina sp.	4	4.00	0.30
Parametriocnemus sp.	2	2.00	0.15
Paraphaenocladius sp.			
Paratanytarsus sp.	20	20.00	1.52
Paratendipes sp.	32	32.00	2.43
Pedicia sp.			
Pericoma sp.			
Phaenopsectra sp.	18	18.00	1.37
Polypedilum sp.	14	14.00	1.06
Procladius sp.	24	24.00	1.82
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	8	8.00	0.61
Radotanypus submarginella	4	4.00	0.30
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	2	2.00	0.15
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	14	14.00	1.06
Tipula sp.	8	8.00	0.61
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	96	96.00	7.29
Planorbidae	2	2.00	0.15
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	34	34.00	2.58
Totals:	1316	1316.00	100.00

Total Density (N/m^2)	1316
Total Number of Taxa	45
Diversity (d)	4.11

WO1

Community Parameters	Kick Sample
Total Density (N/m^2)	1316
Diversity (d)	4.11
Total Number of Taxa	45
% Dominant Taxon	20.82
EPT Richness 4/0/2	6
EPT (abundance)	348.00
Chiron (abundance)	174.00
EPT/Chironomid ratio	2.00
Scraper (abundance)	144.00
Filterer (abundance)	64.00
SC/F ratio	2.25
Shredder (abundance)	24.00
SH/Total ratio	0.02
HBI	7.50
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	25.53
HIRUDINEA	0.91
AMPHIPODA	14.13
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	22.19
ODONATA	6.23
PLECOPTERA	0
HEMIPTERA	0.46
TRICHOPTERA	4.26
COLEOPTERA	0.76
DIPTERA	15.50
GASTROPODA	7.45
BIVALVIA	2.58
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	336
HIRUDINEA	12
AMPHIPODA	186
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	292
ODONATA	82
PLECOPTERA	0
HEMIPTERA	6
TRICHOPTERA	56
COLEOPTERA	10
DIPTERA	204
GASTROPODA	98
BIVALVIA	34
Totals:	1316

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti	52	52.00	5.50
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Naididae (undetermined)	12	12.00	1.27
Nais communis	78	78.00	8.25
Nais simplex	4	4.00	0.42
Nais variabilis			
Pristina aequiseta			
Pristinella sp.	2	2.00	0.21
Tubificidae with hair chaetae	36	36.00	3.81
Tubificidae without hair chaetae	112	112.00	11.84
HIRUDINEA			
Erpobdellidae	10	10.00	1.06
Haemopis marmorata			
Helobdella stagnalis	2	2.00	0.21
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.	10	10.00	1.06
Hyalella azteca	404	404.00	42.71
DECAPODA			
Orconectes sp.	2	2.00	0.21
ACARI			
Limnochares sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	4	4.00	0.42
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
ODONATA			
Aeshna sp.	2	2.00	0.21
Archilestes grandis			
Argia sp.	4	4.00	0.42
Coenagrionidae			
Corduliidae			
Enallagma sp.			
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.	2	2.00	0.21
Limnephilidae			
Ochrotrichia sp.			
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult			
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult	2	2.00	0.21
Laccobius sp. adult			
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult			
Sanfilippodytes sp. adult	2	2.00	0.21
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	26	26.00	2.75
Chaetocladius sp.			
Chironomus sp.	2	2.00	0.21
Corynoneura sp.			
Cricotopus sp.	4	4.00	0.42
Cryptochironomus sp.			
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	4	4.00	0.42
Dixella sp.			
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.			
Helius sp.			

Taxon	Kick Sample n	N/m²	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterbomiella sp.			
Limnophyes sp.			
Limonia sp.			
Maruina sp.			
Micropsectra sp.	14	14.00	1.48
Nanocladius sp.			
Nilotanypus sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	34	34.00	3.59
Paratendipes sp.	18	18.00	1.90
Pedicia sp.			
Pericoma sp.			
Phaenopsectra sp.	4	4.00	0.42
Polypedilum sp.			
Procladius sp.	4	4.00	0.42
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	2	2.00	0.21
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex			
Tabanidae	2	2.00	0.21
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	4	4.00	0.42
Tipula sp.			
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa	24	24.00	2.54
Gyraulus sp.	2	2.00	0.21
Lymnaeidae			
Physa sp.	60	60.00	6.34
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	2	2.00	0.21
Totals:	946	946.00	100.00

Total Density (N/m²)	946
Total Number of Taxa	34
Diversity (d)	3.21

Community Parameters	Kick Sample
Total Density (N/m^2)	946
Diversity (d)	3.21
Total Number of Taxa	34
% Dominant Taxon	42.71
EPT Richness 1/0/1	2
EPT (abundance)	6.00
Chiron (abundance)	90.00
EPT/Chironomid ratio	0.07
Scraper (abundance)	92.00
Filterer (abundance)	2.00
SC/F ratio	46.00
Shredder (abundance)	4.00
SH/Total ratio	0.00
HBI	8.03
ICI	10

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	31.29
HIRUDINEA	1.27
AMPHIPODA	43.76
DECAPODA	0.21
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.42
ODONATA	0.63
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	0.21
COLEOPTERA	0.42
DIPTERA	12.47
GASTROPODA	9.09
BIVALVIA	0.21
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	296
HIRUDINEA	12
AMPHIPODA	414
DECAPODA	2
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	4
ODONATA	6
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	2
COLEOPTERA	4
DIPTERA	118
GASTROPODA	86
BIVALVIA	2
Totals:	946

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	22	22.00	1.19
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	10	10.00	0.54
Lumbricidae			
Naididae (undetermined)			
Nais communis	22	22.00	1.19
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	192	192.00	10.38
Tubificidae without hair chaetae	106	106.00	5.73
HIRUDINEA			
Erpobdellidae	4	4.00	0.22
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	2	2.00	0.11
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	340	340.00	18.38
DECAPODA			
Orconectes sp.			
ACARI			
Limnochares sp.			
COLLEMBOLA	2	2.00	0.11
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus	18	18.00	0.97
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri	134	134.00	7.24
Leptophlebia sp.			
ODONATA			
Aeshna sp.			
Archilestes grandis			
Argia sp.	32	32.00	1.73
Coenagrionidae			
Corduliidae			
Enallagma sp.			
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.	2	2.00	0.11
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	8	8.00	0.43
Ochrotrichia sp.	44	44.00	2.38
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult	8	8.00	0.43
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult	4	4.00	0.22
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult	2	2.00	0.11
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult	6	6.00	0.32
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.	2	2.00	0.11
Bittacomorpha sp.	4	4.00	0.22
Brillia sp.	6	6.00	0.32
Caloparyphus sp.	6	6.00	0.32
Ceratopogonidae	8	8.00	0.43
Chaetocladius sp.	14	14.00	0.76
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	4	4.00	0.22
Dolichopodidae	2	2.00	0.11
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.	140	140.00	7.57
Helius sp.			

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.	2	2.00	0.11
Larsia sp.			
Lauterborniella sp.			
Limnophyes sp.			
Limonia sp.			
Maruina sp.	2	2.00	0.11
Micropsectra sp.	32	32.00	1.73
Nanocladius sp.			
Nilotanypus sp.	42	42.00	2.27
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.	6	6.00	0.32
Paratanytarsus sp.			
Paratendipes sp.	2	2.00	0.11
Pedicia sp.	2	2.00	0.11
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.	6	6.00	0.32
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.	4	4.00	0.22
Pseudosmittia sp.			
Ptychoptera sp.	6	6.00	0.32
Radotanypus submarginella	30	30.00	1.62
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	302	302.00	16.32
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	42	42.00	2.27
Tipula sp.	4	4.00	0.22
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	8	8.00	0.43
Physa sp.	208	208.00	11.24
Planorbidae	2	2.00	0.11
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	6	6.00	0.32
Totals:	1850	1850.00	100.00

Total Density (N/m^2)	1850
Total Number of Taxa	46
Diversity (d)	3.90

RC1

Community Parameters	Kick Sample
Total Density (N/m^2)	1850
Diversity (d)	3.90
Total Number of Taxa	46
% Dominant Taxon	18.38
EPT Richness 2/0/3	5
EPT (abundance)	206.00
Chiron (abundance)	320.00
EPT/Chironomid ratio	0.64
Scraper (abundance)	220.00
Filterer (abundance)	308.00
SC/F ratio	0.71
Shredder (abundance)	26.00
SH/Total ratio	0.01
HBI	7.10
ICI	20

Relative Abundance by Order	
TURBELLARIA	1.19
NEMATODA	0
OLIGOCHAETA	17.84
HIRUDINEA	0.32
AMPHIPODA	18.38
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.11
EPHEMEROPTERA	8.22
ODONATA	1.73
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	2.92
COLEOPTERA	1.08
DIPTERA	36.11
GASTROPODA	11.78
BIVALVIA	0.32
Totals:	100.00

Density by Order	
TURBELLARIA	22
NEMATODA	0
OLIGOCHAETA	330
HIRUDINEA	6
AMPHIPODA	340
DECAPODA	0
ACARI	0
COLEMBOLA	2
EPHEMEROPTERA	152
ODONATA	32
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	54
COLEOPTERA	20
DIPTERA	668
GASTROPODA	218
BIVALVIA	6
Totals:	1850

RC2

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m²	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	40	84.22	1.22
OLIGOCHAETA			
Aulodrilus pigueti	4	8.42	0.12
Dero (Dero) nivea	20	42.11	0.61
Enchytraeidae			
Lumbricidae			
Naididae (undetermined)			
Nais communis	24	50.53	0.73
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	284	597.96	8.63
Tubificidae without hair chaetae	104	218.97	3.16
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	7	14.74	0.21
Mooreobdella microstoma	1	2.11	0.03
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	988	2080.23	30.02
DECAPODA			
Orconectes sp.	1	2.11	0.03
ACARI			
Limnochares sp.			
COLLEMBOLA	4	8.42	0.12
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	272	572.70	8.26
Callibaetis sp.	17	35.79	0.52
Fallceon quilleri	40	84.22	1.22
Leptophlebia sp.	4	8.42	0.12
ODONATA			
Aeshna sp.	1	2.11	0.03
Archilestes grandis			
Argia sp.	76	160.02	2.31
Coenagrionidae	48	101.06	1.46
Corduliidae			
Enallagma sp.			
Ischnura sp.	4	8.42	0.12
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

RC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	36	75.80	1.09
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.	48	101.06	1.46
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult	12	25.27	0.36
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult	4	8.42	0.12
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult	4	8.42	0.12
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	20	42.11	0.61
Paracymus sp. adult	12	25.27	0.36
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	4	8.42	0.12
Chaetocladius sp.	20	42.11	0.61
Chironomus sp.	8	16.84	0.24
Corynoneura sp.	4	8.42	0.12
Cricotopus sp.			
Cryptochironomus sp.	16	33.69	0.49
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	8	16.84	0.24
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.	32	67.38	0.97
Helius sp.	4	8.42	0.12

RC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterborniella sp.	56	117.91	1.70
Limnophyes sp.	8	16.84	0.24
Limonia sp.	4	8.42	0.12
Maruina sp.			
Micropsectra sp.	120	252.66	3.65
Nanocladius sp.	4	8.42	0.12
Nilotanypus sp.	16	33.69	0.49
Paramerina sp.	4	8.42	0.12
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	660	1389.63	20.05
Paratendipes sp.			
Pedicia sp.			
Pericoma sp.			
Phaenopsectra sp.	8	16.84	0.24
Polypedilum sp.	8	16.84	0.24
Procladius sp.	16	33.69	0.49
Pseudochironomus sp.	44	92.64	1.34
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	8	16.84	0.24
Radotanypus submarginella			
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	32	67.38	0.97
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	64	134.75	1.94
Tipula sp.			
Tipulidae pupae	4	8.42	0.12
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	4	8.42	0.12
Physa sp.	28	58.95	0.85
Planorbidae	12	25.27	0.36
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	20	42.11	0.61
Totals:	3291	6929.20	100.00

Total Density (N/m^2)	6929
Total Number of Taxa	54
Diversity (d)	3.72

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.	2	2.00	0.11
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	8	8.00	0.43
Ochrotrichia sp.	44	44.00	2.38
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult	8	8.00	0.43
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult	4	4.00	0.22
Enochrus ochraceous adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult	2	2.00	0.11
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult	6	6.00	0.32
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.	2	2.00	0.11
Bittacomorpha sp.	4	4.00	0.22
Brillia sp.	6	6.00	0.32
Caloparyphus sp.	6	6.00	0.32
Ceratopogonidae	8	8.00	0.43
Chaetocladius sp.	14	14.00	0.76
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	4	4.00	0.22
Dolichopodidae	2	2.00	0.11
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.	140	140.00	7.57
Helius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.	2	2.00	0.11
Larsia sp.			
Lauterborniella sp.			
Limnophyes sp.			
Limonia sp.			
Maruina sp.	2	2.00	0.11
Micropsectra sp.	32	32.00	1.73
Nanocladius sp.			
Nilotanypus sp.	42	42.00	2.27
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.	6	6.00	0.32
Paratanytarsus sp.			
Paratendipes sp.	2	2.00	0.11
Pedicia sp.	2	2.00	0.11
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.	6	6.00	0.32
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.	4	4.00	0.22
Pseudosmittia sp.			
Ptychoptera sp.	6	6.00	0.32
Radotanypus submarginella	30	30.00	1.62
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	302	302.00	16.32
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	42	42.00	2.27
Tipula sp.	4	4.00	0.22
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	8	8.00	0.43
Physa sp.	208	208.00	11.24
Planorbidae	2	2.00	0.11
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	6	6.00	0.32
Totals:	1850	1850.00	100.00

Total Density (N/m^2)	1850
Total Number of Taxa	46
Diversity (d)	3.90

RC1

Community Parameters	Kick Sample
Total Density (N/m^2)	1850
Diversity (d)	3.90
Total Number of Taxa	46
% Dominant Taxon	18.38
EPT Richness 2/0/3	5
EPT (abundance)	206.00
Chiron (abundance)	320.00
EPT/Chironomid ratio	0.64
Scraper (abundance)	220.00
Filterer (abundance)	308.00
SC/F ratio	0.71
Shredder (abundance)	26.00
SH/Total ratio	0.01
HBI	7.10
ICI	20

Relative Abundance by Order	
TURBELLARIA	1.19
NEMATODA	0
OLIGOCHAETA	17.84
HIRUDINEA	0.32
AMPHIPODA	18.38
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.11
EPHEMEROPTERA	8.22
ODONATA	1.73
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	2.92
COLEOPTERA	1.08
DIPTERA	36.11
GASTROPODA	11.78
BIVALVIA	0.32
Totals:	100.00

Density by Order	
TURBELLARIA	22
NEMATODA	0
OLIGOCHAETA	330
HIRUDINEA	6
AMPHIPODA	340
DECAPODA	0
ACARI	0
COLEMBOLA	2
EPHEMEROPTERA	152
ODONATA	32
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	54
COLEOPTERA	20
DIPTERA	668
GASTROPODA	218
BIVALVIA	6
Totals:	1850

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	40	84.22	1.22
OLIGOCHAETA			
Aulodrilus pigueti	4	8.42	0.12
Dero (Dero) nivea	20	42.11	0.61
Enchytraeidae			
Lumbricidae			
Naididae (undetermined)			
Nais communis	24	50.53	0.73
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Pristinella sp.			
Tubificidae with hair chaetae	284	597.96	8.63
Tubificidae without hair chaetae	104	218.97	3.16
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	7	14.74	0.21
Mooreobdella microstoma	1	2.11	0.03
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	988	2080.23	30.02
DECAPODA			
Orconectes sp.	1	2.11	0.03
ACARI			
Limnochares sp.			
COLLEMBOLA	4	8.42	0.12
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	272	572.70	8.26
Callibaetis sp.	17	35.79	0.52
Fallceon quilleri	40	84.22	1.22
Leptophlebia sp.	4	8.42	0.12
ODONATA			
Aeshna sp.	1	2.11	0.03
Archilestes grandis			
Argia sp.	76	160.02	2.31
Coenagrionidae	48	101.06	1.46
Corduliidae			
Enallagma sp.			
Ischnura sp.	4	8.42	0.12
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	36	75.80	1.09
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.	48	101.06	1.46
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult			
Agabus seriatus adult			
Anacaena sp. adult	12	25.27	0.36
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult	4	8.42	0.12
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Hydroporus sp. adult			
Ilybius fraterculus adult			
Laccobius sp. adult	4	8.42	0.12
Liodessus obscurellus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	20	42.11	0.61
Paracymus sp. adult	12	25.27	0.36
Sanfilippodytes sp. adult			
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	4	8.42	0.12
Chaetocladius sp.	20	42.11	0.61
Chironomus sp.	8	16.84	0.24
Corynoneura sp.	4	8.42	0.12
Cricotopus sp.			
Cryptochironomus sp.	16	33.69	0.49
Culex sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	8	16.84	0.24
Dolichopodidae			
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.	32	67.38	0.97
Helius sp.	4	8.42	0.12

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterborniella sp.	56	117.91	1.70
Limnophyes sp.	8	16.84	0.24
Limonia sp.	4	8.42	0.12
Maruina sp.			
Micropsectra sp.	120	252.66	3.65
Nanocladius sp.	4	8.42	0.12
Nilotanypus sp.	16	33.69	0.49
Paramerina sp.	4	8.42	0.12
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	660	1389.63	20.05
Paratendipes sp.			
Pedicia sp.			
Pericoma sp.			
Phaenopsectra sp.	8	16.84	0.24
Polypedilum sp.	8	16.84	0.24
Procladius sp.	16	33.69	0.49
Pseudochironomus sp.	44	92.64	1.34
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	8	16.84	0.24
Radotanypus submarginella			
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	32	67.38	0.97
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	64	134.75	1.94
Tipula sp.			
Tipulidae pupae	4	8.42	0.12
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	4	8.42	0.12
Physa sp.	28	58.95	0.85
Planorbidae	12	25.27	0.36
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	20	42.11	0.61
Totals:	3291	6929.20	100.00

Total Density (N/m^2)	6929
Total Number of Taxa	54
Diversity (d)	3.72

Community Parameters	Kick Sample
Total Density (N/m^2)	6929
Diversity (d)	3.72
Total Number of Taxa	54
% Dominant Taxon	30.02
EPT Richness 4/0/2	6
EPT (abundance)	877.99
Chiron (abundance)	2290.78
EPT/Chironomid ratio	0.38
Scraper (abundance)	151.60
Filterer (abundance)	185.28
SC/F ratio	0.82
Shredder (abundance)	33.69
SH/Total ratio	0.00
HBI	7.26
ICI	20

Relative Abundance by Order	
TURBELLARIA	1.22
NEMATODA	0
OLIGOCHAETA	13.25
HIRUDINEA	0.24
AMPHIPODA	30.02
DECAPODA	0.03
ACARI	0.00
COLEMBOLA	0.12
EPHEMEROPTERA	10.12
ODONATA	3.92
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	2.55
COLEOPTERA	1.58
DIPTERA	35.00
GASTROPODA	1.34
BIVALVIA	0.61
Totals:	100.00

Density by Order	
TURBELLARIA	84
NEMATODA	0
OLIGOCHAETA	918
HIRUDINEA	17
AMPHIPODA	2080
DECAPODA	2
ACARI	0
COLEMBOLA	8
EPHEMEROPTERA	701
ODONATA	272
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	177
COLEOPTERA	109
DIPTERA	2426
GASTROPODA	93
BIVALVIA	42
Totals:	6929

RC3

Sample Date: 14 August 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea	3	6.32	0.42
Enchytraeidae	69	145.28	9.60
Lumbricidae	1	2.11	0.14
Naididae (undetermined)			
Nais communis	4	8.42	0.56
Nais simplex			
Nais variabilis			
Pristina aequiseta	86	181.07	11.96
Pristinella sp.			
Tubificidae with hair chaetae	38	80.01	5.29
Tubificidae without hair chaetae	59	124.22	8.21
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Helobdella stagnalis			
Mooreobdella fervida	1	2.11	0.14
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	5	10.53	0.70
DECAPODA			
Orconectes sp.	1	2.11	0.14
ACARI			
Limnochares sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Acentrella insignificans			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
ODONATA			
Aeshna sp.			
Archilestes grandis			
Argia sp.			
Coenagrionidae	1	2.11	0.14
Corduliidae	1	2.11	0.14
Enallagma sp.			
Ischnura sp.			
Libellulidae			
HEMIPTERA			
Aquarius remigis			
Corixidae larvae			
Notonecta kirbyi			
Notonecta undulata			
Sigara alternata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Helicopsyche borealis			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Ochrotrichia sp.	1	2.11	0.14
COLEOPTERA			
Agabus griseipennis adult			
Agabus semivittatus adult	8	16.84	1.11
Agabus seriatus adult	1	2.11	0.14
Anacaena sp. adult	9	18.95	1.25
Carabidae larvae			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Haliplus immaculicollis adult	2	4.21	0.28
Haliplus sp. larvae	2	4.21	0.28
Helophorus lacustris adult	2	4.21	0.28
Hydroporinae larvae	1	2.11	0.14
Hydroporus sp. adult	1	2.11	0.14
Ilybius fraterculus adult			
Laccobius sp. adult			
Liodessus obscurellus adult	1	2.11	0.14
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	1	2.11	0.14
Paracymus sp. adult	1	2.11	0.14
Sanfilippodytes sp. adult	9	18.95	1.25
Stictotarsus striatellus adult			
Tropisternus sp. larvae			
Tropisternus sublaevis adult			
DIPTERA			
Aedes sp.			
Apedilum sp.			
Atrichopogon sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	3	6.32	0.42
Chaetocladius sp.			
Chironomus sp.	2	4.21	0.28
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culex sp.			
Dasyhelea sp.	93	195.81	12.93
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae	1	2.11	0.14
Eukiefferiella sp.			
Glyptotendipes sp.			
Heleniella sp.			
Helius sp.			

RC3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Hemerodromia sp.			
Larsia sp.			
Lauterbomiella sp.			
Limnophyes sp.	15	31.58	2.09
Limonia sp.			
Maruina sp.			
Micropsectra sp.	11	23.16	1.53
Nanocladius sp.			
Nilotanypus sp.	1	2.11	0.14
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	2	4.21	0.28
Paratendipes sp.	1	2.11	0.14
Pedicia sp.	11	23.16	1.53
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	4	8.42	0.56
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Rheotanytarsus sp.			
Sciomyzidae			
Simulium decorum			
Simulium vittatum complex	1	2.11	0.14
Tabanidae			
Tanypus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	1	2.11	0.14
Tipula sp.			
Tipulidae pupae			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.	8	16.84	1.11
Lymnaeidae	20	42.11	2.78
Physa sp.	231	486.37	32.13
Planorbidae	6	12.63	0.83
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	719	1513.85	100.00

Total Density (N/m^2)	1514
Total Number of Taxa	42
Diversity (d)	3.47

Community Parameters	Kick Sample
Total Density (N/m^2)	1514
Diversity (d)	3.47
Total Number of Taxa	42
% Dominant Taxon	32.13
EPT Richness 0/0/1	1
EPT (abundance)	2.11
Chiron (abundance)	77.90
EPT/Chironomid ratio	0.03
Scraper (abundance)	560.06
Filterer (abundance)	2.11
SC/F ratio	266.00
Shredder (abundance)	4.21
SH/Total ratio	0.00
HBI	8.15
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	36.16
HIRUDINEA	0.14
AMPHIPODA	0.70
DECAPODA	0.14
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	0.28
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	0.14
COLEOPTERA	5.29
DIPTERA	20.31
GASTROPODA	36.86
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	547
HIRUDINEA	2
AMPHIPODA	11
DECAPODA	2
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	4
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	2
COLEOPTERA	80
DIPTERA	307
GASTROPODA	558
BIVALVIA	0
Totals:	1514

WALNUT CREEK
WC1

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae	4	6.00	0.32
Lumbricidae	4	6.00	0.32
Nais communis			
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	188	282.00	14.96
DECAPODA			
Orconectes sp.	1	1.50	0.08
ACARI			
Hygrobates sp.	4	6.00	0.32
COLLEMBOLA	8	12.00	0.64
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	4	6.00	0.32
Callibaetis sp.			
Fallceon quilleri	4	6.00	0.32
Leptophlebia sp.			
Tricorythodes minutus	4	6.00	0.32
ODONATA			
Aeshna sp.	8	12.00	0.64
Amphiagrion abbreviatum			
Argia sp.	132	198.00	10.50
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

WC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	80	120.00	6.36
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	4	6.00	0.32
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	48	72.00	3.82
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.	40	60.00	3.18
Caloparyphus sp.			
Ceratopogonidae	4	6.00	0.32
Chaetocladius sp.			
Chironomus sp.	12	18.00	0.95
Clinocera sp.			
Corynoneura sp.	40	60.00	3.18
Cricotopus sp.			
Cryptochironomus sp.	12	18.00	0.95
Dasyhelea sp.			
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophila sp.	4	6.00	0.32
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.			
Micropsectra sp.	28	42.00	2.23

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.	4	6.00	0.32
Paraphaenocladius sp.			
Paratanytarsus sp.	4	6.00	0.32
Paratendipes sp.	204	306.00	16.23
Phaenopsectra sp.	52	78.00	4.14
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	108	162.00	8.59
Rheocricotopus sp.			
Simulium vittatum complex	8	12.00	0.64
Stictochironomus sp.	4	6.00	0.32
Tanytarsus sp.	16	24.00	1.27
Thienemanniella sp.	4	6.00	0.32
Thienemannimyia group	96	144.00	7.64
Tipula sp.	44	66.00	3.50
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	72	108.00	5.73
Planorbidae	4	6.00	0.32
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	4	6.00	0.32
Totals:	1257	1885.50	100.00

Total Density (N/m^2)	1886
Total Number of Taxa	35
Diversity (d)	3.98

Community Parameters	Kick Sample
Total Density (N/m^2)	1886
Diversity (d)	3.98
Total Number of Taxa	35
% Dominant Taxon	16.23
EPT Richness 3/0/1	4
EPT (abundance)	138.00
Chiron (abundance)	936.00
EPT/Chironomid ratio	0.15
Scraper (abundance)	192.00
Filterer (abundance)	42.00
SC/F ratio	4.57
Shredder (abundance)	246.00
SH/Total ratio	0.13
HBI	6.92
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	0.64
HIRUDINEA	0.00
AMPHIPODA	14.96
DECAPODA	0.08
ACARI	0.32
COLEMBOLA	0.64
EPHEMEROPTERA	0.95
ODONATA	11.14
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	6.36
COLEOPTERA	4.14
DIPTERA	54.42
GASTROPODA	6.05
BIVALVIA	0.32
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	12
HIRUDINEA	0
AMPHIPODA	282
DECAPODA	2
ACARI	6
COLEMBOLA	12
EPHEMEROPTERA	18
ODONATA	210
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	120
COLEOPTERA	78
DIPTERA	1026
GASTROPODA	114
BIVALVIA	6
Totals:	1886

WALNUT CREEK
WC2

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis			
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	416	1320.80	19.15
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	420	1333.50	19.34
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	8	25.40	0.37
Coenagrionidae	60	190.50	2.76
Enallagma sp.	24	76.20	1.10
Ischnura sp.	12	38.10	0.55
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

WC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	60	190.50	2.76
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	20	63.50	0.92
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	4	12.70	0.18
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult	12	38.10	0.55
DIPTERA			
Brillia sp.	8	25.40	0.37
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	16	50.80	0.74
Clinocera sp.			
Corynoneura sp.	16	50.80	0.74
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.	16	50.80	0.74
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.	4	12.70	0.18
Metriocnemus sp.			
Micropsectra sp.	28	88.90	1.29

WC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.	12	38.10	0.55
Paraphaenocladius sp.			
Paratanytarsus sp.	80	254.00	3.68
Paratendipes sp.	40	127.00	1.84
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	4	12.70	0.18
Rheocricotopus sp.			
Simulium vittatum complex			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.	12	38.10	0.55
Thienemannimyia group	32	101.60	1.47
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae	72	228.60	3.31
Physa sp.	784	2489.20	36.10
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	12	38.10	0.55
Totals:	2172	6896.10	100.00

Total Density (N/m^2)	6896
Total Number of Taxa	25
Diversity (d)	2.95

WC2

Community Parameters	Kick Sample
Total Density (N/m^2)	6896
Diversity (d)	2.95
Total Number of Taxa	25
% Dominant Taxon	36.10
EPT Richness 1/0/1	2
EPT (abundance)	1524.00
Chiron (abundance)	850.90
EPT/Chironomid ratio	1.79
Scraper (abundance)	2717.80
Filterer (abundance)	38.10
SC/F ratio	71.33
Shredder (abundance)	215.90
SH/Total ratio	0.03
HBI	7.89
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	0.00
HIRUDINEA	0.00
AMPHIPODA	19.15
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	19.34
ODONATA	4.79
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	2.76
COLEOPTERA	1.66
DIPTERA	12.34
GASTROPODA	39.41
BIVALVIA	0.55
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	0
HIRUDINEA	0
AMPHIPODA	1321
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	1334
ODONATA	330
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	191
COLEOPTERA	114
DIPTERA	851
GASTROPODA	2718
BIVALVIA	38
Totals:	6896

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae	4	4.00	0.09
Lumbricidae			
Nais communis	16	16.00	0.36
Nais elinguis			
Nais simplex			
Nais variabilis	12	12.00	0.27
Pristina aequiseta	224	224.00	5.02
Tubificidae with hair chaetae	12	12.00	0.27
Tubificidae without hair chaetae	12	12.00	0.27
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida	5	5.00	0.11
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	316	316.00	7.08
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus	52	52.00	1.16
Baetis notos	12	12.00	0.27
Baetis tricaudatus	1888	1888.00	42.28
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri	128	128.00	2.87
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	44	44.00	0.99
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta	4	4.00	0.09
Corisella tarsalis	8	8.00	0.18
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	784	784.00	17.56
Hesperophylax sp.			
Hydropsyche sp.	172	172.00	3.85
Hydroptila sp.	72	72.00	1.61
Limnephilidae			
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	8	8.00	0.18
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.	4	4.00	0.09
Caloparyphus sp.			
Ceratopogonidae	4	4.00	0.09
Chaetocladius sp.			
Chironomus sp.	8	8.00	0.18
Clinocera sp.			
Corynoneura sp.	16	16.00	0.36
Cricotopus sp.	68	68.00	1.52
Cryptochironomus sp.	60	60.00	1.34
Dasyhelea sp.			
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	16	16.00	0.36
Hemerodromia sp.	12	12.00	0.27
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.	4	4.00	0.09
Limnophyes sp.	4	4.00	0.09
Metriocnemus sp.			
Micropsectra sp.	36	36.00	0.81

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex	224	224.00	5.02
Stictochironomus sp.	32	32.00	0.72
Tanytarsus sp.			
Thienemanniella sp.	108	108.00	2.42
Thienemannimyia group	16	16.00	0.36
Tipula sp.			
Tvetenia sp.	12	12.00	0.27
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae	40	40.00	0.90
Physa sp.	28	28.00	0.63
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	4465	4465.00	100.00
Total Density (N/m^2)		4465	
Total Number of Taxa		37	
Diversity (d)		3.12	

Community Parameters	Kick Sample
Total Density (N/m^2)	4465
Diversity (d)	3.12
Total Number of Taxa	37
% Dominant Taxon	42.28
EPT Richness 4/0/3	7
EPT (abundance)	3108.00
Chiron (abundance)	380.00
EPT/Chironomid ratio	8.18
Scraper (abundance)	140.00
Filterer (abundance)	1180.00
SC/F ratio	0.12
Shredder (abundance)	72.00
SH/Total ratio	0.02
HBI	5.73
ICI	38

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	6.27
HIRUDINEA	0.11
AMPHIPODA	7.08
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	46.58
ODONATA	0.99
PLECOPTERA	0.00
HEMIPTERA	0.27
TRICHOPTERA	23.02
COLEOPTERA	0.18
DIPTERA	13.98
GASTROPODA	1.52
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	280
HIRUDINEA	5
AMPHIPODA	316
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	2080
ODONATA	44
PLECOPTERA	0
HEMIPTERA	12
TRICHOPTERA	1028
COLEOPTERA	8
DIPTERA	624
GASTROPODA	68
BIVALVIA	0
Totals:	4465

WC4

Sample Date: 19 October 2001

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA	156	432.98	5.43
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae	404	1121.30	14.07
Lumbricidae	208	577.30	7.24
Nais communis			
Nais elinguis			
Nais simplex			
Nais variabilis	64	177.63	2.23
Pristina aequiseta			
Tubificidae with hair chaetae	140	388.57	4.87
Tubificidae without hair chaetae	312	865.96	10.86
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca			
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	8	22.20	0.28
Fallceon quilleri	4	11.10	0.14
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis	36	99.92	1.25

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	164	455.18	5.71
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult	8	22.20	0.28
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	4	11.10	0.14
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult	8	22.20	0.28
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult	8	22.20	0.28
Tropisternus sublaevis adult	4	11.10	0.14
DIPTERA			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	20	55.51	0.70
Chaetocladius sp.			
Chironomus sp.	16	44.41	0.56
Clinocera sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.	132	366.37	4.60
Dicranota sp.			
Dicrotendipes sp.	4	11.10	0.14
Dixella sp.			
Dolichopodidae	4	11.10	0.14
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.	4	11.10	0.14
Limnophila sp.			
Limnophora sp.	4	11.10	0.14
Limnophyes sp.	64	177.63	2.23
Metriocnemus sp.			
Micropsectra sp.	8	22.20	0.28

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Phaenopsectra sp.			
Polypedilum sp.	4	11.10	0.14
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	8	22.20	0.28
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae	120	333.06	4.18
Physa sp.	952	2642.28	33.15
Planorbidae	4	11.10	0.14
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	2872	7971.24	100.00

Total Density (N/m^2)	7971
Total Number of Taxa	29
Diversity (d)	3.30

Community Parameters	Kick Sample
Total Density (N/m^2)	7971
Diversity (d)	3.30
Total Number of Taxa	29
% Dominant Taxon	33.15
EPT Richness 2/0/1	3
EPT (abundance)	488.49
Chiron (abundance)	666.12
EPT/Chironomid ratio	0.73
Scraper (abundance)	2986.44
Filterer (abundance)	0.00
SC/F ratio	n/a
Shredder (abundance)	488.49
SH/Total ratio	0.06
HBI	8.06
ICI	16

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	5.43
OLIGOCHAETA	39.28
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.42
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	1.25
TRICHOPTERA	5.71
COLEOPTERA	1.11
DIPTERA	9.33
GASTROPODA	37.47
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	433
OLIGOCHAETA	3131
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	33
ODONATA	0
PLECOPTERA	0
HEMIPTERA	100
TRICHOPTERA	455
COLEOPTERA	89
DIPTERA	744
GASTROPODA	2986
BIVALVIA	0
Totals:	7971

WC5

Sample Date: 19 October 2001

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA	88	185.28	7.10
OLIGOCHAETA			
Dero (Dero) nivea	12	25.27	0.97
Enchytraeidae	132	277.93	10.65
Lumbricidae	12	25.27	0.97
Nais communis			
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae	16	33.69	1.29
Tubificidae without hair chaetae	20	42.11	1.61
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis	4	8.42	0.32
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	4	8.42	0.32
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	8	16.84	0.65
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae	4	8.42	0.32
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis	4	8.42	0.32

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	4	8.42	0.32
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae			
Gymnochthebius falli adult	4	8.42	0.32
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult	4	8.42	0.32
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult	12	25.27	0.97
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	4	8.42	0.32
Chaetocladius sp.			
Chironomus sp.	12	25.27	0.97
Clinocera sp.			
Corynoneura sp.	12	25.27	0.97
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.	168	353.72	13.55
Dicranota sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.	68	143.17	5.48
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.			
Micropsectra sp.	12	25.27	0.97

WC5 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	4	8.42	0.32
Paratendipes sp.	4	8.42	0.32
Phaenopsectra sp.	8	16.84	0.65
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.	4	8.42	0.32
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	8	16.84	0.65
Rheocricotopus sp.	8	16.84	0.65
Simulium vittatum complex			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae	128	269.50	10.32
Physa sp.	440	926.42	35.48
Planorbidae			
Stagnicola caperata	32	67.38	2.58
BIVALVIA			
Pisidium sp.			
Totals:	1240	2610.82	100.00

Total Density (N/m^2)	2611
Total Number of Taxa	30
Diversity (d)	3.29

Community Parameters	Kick Sample
Total Density (N/m^2)	2611
Diversity (d)	3.29
Total Number of Taxa	30
% Dominant Taxon	35.48
EPT Richness 1/0/1	2
EPT (abundance)	25.27
Chiron (abundance)	648.49
EPT/Chironomid ratio	0.04
Scraper (abundance)	1280.14
Filterer (abundance)	0.00
SC/F ratio	n/a
Shredder (abundance)	8.42
SH/Total ratio	0.00
HBI	7.43
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	7.10
OLIGOCHAETA	15.48
HIRUDINEA	0.32
AMPHIPODA	0.32
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.65
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	0.65
TRICHOPTERA	0.32
COLEOPTERA	1.61
DIPTERA	25.16
GASTROPODA	48.39
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	185
OLIGOCHAETA	404
HIRUDINEA	8
AMPHIPODA	8
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	17
ODONATA	0
PLECOPTERA	0
HEMIPTERA	17
TRICHOPTERA	8
COLEOPTERA	42
DIPTERA	657
GASTROPODA	1263
BIVALVIA	0
Totals:	2611

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	4	11.10	0.12
Nais communis	512	1421.06	15.38
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	40	111.02	1.20
HIRUDINEA			
Erpobdellidae	4	11.10	0.12
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.	8	22.20	0.24
Hyalella azteca	28	77.71	0.84
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.	8	22.20	0.24
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	1212	3363.91	36.42
Callibaetis sp.	12	33.31	0.36
Fallceon quilleri	24	66.61	0.72
Leptophlebia sp.	52	144.33	1.56
Tricorythodes minutus			
ODONATA			
Aeshna sp.	4	11.10	0.12
Amphiagrion abbreviatum	4	11.10	0.12
Argia sp.	24	66.61	0.72
Coenagrionidae			
Enallagma sp.			
Ischnura sp.	24	66.61	0.72
PLECOPTERA			
Capnura wanica	4	11.10	0.12
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

WO1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.	4	11.10	0.12
Limnephilidae	20	55.51	0.60
Limnephilus sp.	8	22.20	0.24
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult	4	11.10	0.12
Colymbetinae larvae	24	66.61	0.72
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.	60	166.53	1.80
Caloparyphus sp.			
Ceratopogonidae	76	210.94	2.28
Chaetocladius sp.	4	11.10	0.12
Chironomus sp.			
Clinocera sp.			
Corynoneura sp.	76	210.94	2.28
Cricotopus sp.	8	22.20	0.24
Cryptochironomus sp.	56	155.43	1.68
Dasyhelea sp.	4	11.10	0.12
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.	36	99.92	1.08
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.	12	33.31	0.36
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.			
Micropsectra sp.	296	821.55	8.89

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.	20	55.51	0.60
Paraphaenocladius sp.			
Paratanytarsus sp.	44	122.12	1.32
Paratendipes sp.	64	177.63	1.92
Phaenopsectra sp.	52	144.33	1.56
Polypedilum sp.	44	122.12	1.32
Procladius sp.	12	33.31	0.36
Pseudochironomus sp.	4	11.10	0.12
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	8	22.20	0.24
Radotanypus submarginella	16	44.41	0.48
Rheocricotopus sp.	88	244.24	2.64
Simulium vittatum complex	40	111.02	1.20
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.	16	44.41	0.48
Thienemannimyia group	88	244.24	2.64
Tipula sp.	56	155.43	1.68
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae	4	11.10	0.12
Physa sp.	104	288.65	3.13
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	16	44.41	0.48
Totals:	3328	9236.86	100.00

Total Density (N/m^2)	9237
Total Number of Taxa	48
Diversity (d)	3.71

Community Parameters	Kick Sample
Total Density (N/m^2)	9237
Diversity (d)	3.71
Total Number of Taxa	48
% Dominant Taxon	36.42
EPT Richness 4/1/3	8
EPT (abundance)	3708.07
Chiron (abundance)	2764.40
EPT/Chironomid ratio	1.34
Scraper (abundance)	455.18
Filterer (abundance)	155.43
SC/F ratio	2.93
Shredder (abundance)	555.10
SH/Total ratio	0.06
HBI	7.10
ICI	40

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	16.71
HIRUDINEA	0.12
AMPHIPODA	1.08
DECAPODA	0.00
ACARI	0.24
COLEMBOLA	0.00
EPHEMEROPTERA	39.06
ODONATA	1.68
PLECOPTERA	0.12
HEMIPTERA	0.00
TRICHOPTERA	0.96
COLEOPTERA	0.84
DIPTERA	35.46
GASTROPODA	3.25
BIVALVIA	0.48
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1543
HIRUDINEA	11
AMPHIPODA	100
DECAPODA	0
ACARI	22
COLEMBOLA	0
EPHEMEROPTERA	3608
ODONATA	155
PLECOPTERA	11
HEMIPTERA	0
TRICHOPTERA	89
COLEOPTERA	78
DIPTERA	3275
GASTROPODA	300
BIVALVIA	44
Totals:	9237

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea	32	88.82	2.21
Enchytraeidae			
Lumbricidae	8	22.20	0.55
Nais communis	312	865.96	21.53
Nais elinguis	36	99.92	2.48
Nais simplex	48	133.22	3.31
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae	4	11.10	0.28
Tubificidae without hair chaetae	4	11.10	0.28
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.	32	88.82	2.21
Hyalella azteca	272	754.94	18.77
DECAPODA			
Orconectes sp.	1	2.78	0.07
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	52	144.33	3.59
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.	4	11.10	0.28
Amphiagrion abbreviatum			
Argia sp.	16	44.41	1.10
Coenagrionidae			
Enallagma sp.			
Ischnura sp.	16	44.41	1.10
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	8	22.20	0.55
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	8	22.20	0.55
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult	4	11.10	0.28
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	4	11.10	0.28
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	8	22.20	0.55
Laccophilus proximus adult			
Neoporus dimidiatus adult	20	55.51	1.38
Ochthebius sp. adult			
Optioservus sp. adult and larvae	4	11.10	0.28
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.	28	77.71	1.93
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	44	122.12	3.04
Clinocera sp.			
Corynoneura sp.	120	333.06	8.28
Cricotopus sp.	12	33.31	0.83
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.	44	122.12	3.04
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.	12	33.31	0.83
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.			
Micropsectra sp.	8	22.20	0.55

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.	4	11.10	0.28
Paraphaenocladius sp.			
Paratanytarsus sp.	8	22.20	0.55
Paratendipes sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	4	11.10	0.28
Rheocricotopus sp.	40	111.02	2.76
Simulium vittatum complex	120	333.06	8.28
Stictochironomus sp.			
Tanytarsus sp.	32	88.82	2.21
Thienemanniella sp.			
Thienemannimyia group	4	11.10	0.28
Tipula sp.	16	44.41	1.10
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.	36	99.92	2.48
Lymnaeidae	4	11.10	0.28
Physa sp.	20	55.51	1.38
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	1449	4021.70	100.00

Total Density (N/m^2)	4022
Total Number of Taxa	39
Diversity (d)	4.04

Community Parameters	Kick Sample
Total Density (N/m^2)	4022
Diversity (d)	4.04
Total Number of Taxa	39
% Dominant Taxon	21.53
EPT Richness 1/0/2	3
EPT (abundance)	188.73
Chiron (abundance)	999.18
EPT/Chironomid ratio	0.19
Scraper (abundance)	177.63
Filterer (abundance)	444.08
SC/F ratio	0.40
Shredder (abundance)	177.63
SH/Total ratio	0.04
HBI	7.72
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	30.64
HIRUDINEA	0.00
AMPHIPODA	20.98
DECAPODA	0.07
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	3.59
ODONATA	2.48
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.10
COLEOPTERA	2.76
DIPTERA	34.23
GASTROPODA	4.14
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1232
HIRUDINEA	0
AMPHIPODA	844
DECAPODA	3
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	144
ODONATA	100
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	44
COLEOPTERA	111
DIPTERA	1377
GASTROPODA	167
BIVALVIA	0
Totals:	4022

Sample Date: 7 November 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae	16	33.69	1.41
Lumbricidae	12	25.27	1.06
Nais communis			
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae	764	1608.60	67.49
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.	4	8.42	0.35
Hyalella azteca			
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica	24	50.53	2.12
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi	8	16.84	0.71
Sigara grossolineata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult	20	42.11	1.77
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult	4	8.42	0.35
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult	16	33.69	1.41
Tropisternus lateralis adult			
Tropisternus sublaevis adult			
DIPTERA			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Clinocera sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.	124	261.08	10.95
Dicranota sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.	116	244.24	10.25
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.	8	16.84	0.71
Micropsectra sp.			

WO3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides	4	8.42	0.35
Gyraulus sp.			
Lymnaeidae	12	25.27	1.06
Physa sp.			
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	1132	2383.43	100.00
Total Density (N/m^2)		2383	
Total Number of Taxa		14	
Diversity (d)		1.79	

Community Parameters	Kick Sample
Total Density (N/m^2)	2383
Diversity (d)	1.79
Total Number of Taxa	14
% Dominant Taxon	67.49
EPT Richness 0/1/0	1
EPT (abundance)	50.53
Chiron (abundance)	522.16
EPT/Chironomid ratio	0.10
Scraper (abundance)	33.69
Filterer (abundance)	0.00
SC/F ratio	n/a
Shredder (abundance)	50.53
SH/Total ratio	0.02
HBI	8.75
ICI	2

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	69.96
HIRUDINEA	0.00
AMPHIPODA	0.35
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	0.00
PLECOPTERA	2.12
HEMIPTERA	0.71
TRICHOPTERA	0.00
COLEOPTERA	3.53
DIPTERA	21.91
GASTROPODA	1.41
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1668
HIRUDINEA	0
AMPHIPODA	8
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	0
PLECOPTERA	51
HEMIPTERA	17
TRICHOPTERA	0
COLEOPTERA	84
DIPTERA	522
GASTROPODA	34
BIVALVIA	0
Totals:	2383

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	48	96.00	3.91
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis	4	8.00	0.33
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae	16	32.00	1.30
Tubificidae without hair chaetae	200	400.00	16.29
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida	4	8.00	0.33
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	136	272.00	11.07
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	60	120.00	4.89
Callibaetis sp.			
Fallceon quilleri	32	64.00	2.61
Leptophlebia sp.	4	8.00	0.33
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	36	72.00	2.93
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.	4	8.00	0.33
Limnephilidae	8	16.00	0.65
Limnephilus sp.	8	16.00	0.65
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult	4	8.00	0.33
Colymbetinae larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult	8	16.00	0.65
DIPTERA			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	4	8.00	0.33
Chaetocladius sp.	4	8.00	0.33
Chironomus sp.			
Clinocera sp.			
Corynoneura sp.			
Cricotopus sp.	4	8.00	0.33
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.			
Dixella sp.			
Dolichopodidae			
Empididae	4	8.00	0.33
Ephydridae	4	8.00	0.33
Eukiefferiella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.			
Metriocnemus sp.			
Micropsectra sp.	40	80.00	3.26

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.	4	8.00	0.33
Phaenopsectra sp.			
Polypedilum sp.	8	16.00	0.65
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex	68	136.00	5.54
Stictochironomus sp.			
Tanytarsus sp.	24	48.00	1.95
Thienemanniella sp.	8	16.00	0.65
Thienemannimyia group	16	32.00	1.30
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	448	896.00	36.48
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	20	40.00	1.63
Totals:	1228	2456.00	100.00

Total Density (N/m^2)	2456
Total Number of Taxa	29
Diversity (d)	3.29

Community Parameters	Kick Sample
Total Density (N/m^2)	2456
Diversity (d)	3.29
Total Number of Taxa	29
% Dominant Taxon	36.48
EPT Richness 3/0/3	6
EPT (abundance)	232.00
Chiron (abundance)	216.00
EPT/Chironomid ratio	1.07
Scraper (abundance)	904.00
Filterer (abundance)	224.00
SC/F ratio	4.04
Shredder (abundance)	56.00
SH/Total ratio	0.02
HBI	7.65
ICI	22

Relative Abundance by Order	
TURBELLARIA	3.91
NEMATODA	0.00
OLIGOCHAETA	17.92
HIRUDINEA	0.33
AMPHIPODA	11.07
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	7.82
ODONATA	2.93
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.63
COLEOPTERA	0.98
DIPTERA	15.31
GASTROPODA	36.48
BIVALVIA	1.63
Totals:	100.00

Density by Order	
TURBELLARIA	96
NEMATODA	0
OLIGOCHAETA	440
HIRUDINEA	8
AMPHIPODA	272
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	192
ODONATA	72
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	40
COLEOPTERA	24
DIPTERA	376
GASTROPODA	896
BIVALVIA	40
Totals:	2456

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	116	321.96	6.00
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis	56	155.43	2.90
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta			
Tubificidae with hair chaetae	12	33.31	0.62
Tubificidae without hair chaetae	20	55.51	1.04
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida	8	22.20	0.41
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	148	410.77	7.66
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.	4	11.10	0.21
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	8	22.20	0.41
Caenis bajaensis	208	577.30	10.77
Callibaetis sp.	28	77.71	1.45
Fallceon quilleri	432	1199.02	22.36
Leptophlebia sp.	20	55.51	1.04
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	32	88.82	1.66
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera	4	11.10	0.21
Notonecta kirbyi	4	11.10	0.21
Sigara grossolineata	4	11.10	0.21
Trichocorixa borealis			

Taxon	Kick Sample n	Kick Sample N/m²	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	64	177.63	3.31
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.	12	33.31	0.62
Limnephilidae	4	11.10	0.21
Limnephilus sp.			
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	4	11.10	0.21
Helophorus lacustris adult			
Hydroporinae larvae			
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae	48	133.22	2.48
Rhantus gutticollis adult	4	11.10	0.21
Sanfilippodytes sp. adult			
Tropisternus lateralis adult	12	33.31	0.62
Tropisternus sublaevis adult	60	166.53	3.11
DIPTERA			
Brillia sp.			
Caloparyphus sp.	4	11.10	0.21
Ceratopogonidae	28	77.71	1.45
Chaetocladius sp.			
Chironomus sp.			
Clinocera sp.			
Corynoneura sp.			
Cricotopus sp.	8	22.20	0.41
Cryptochironomus sp.	4	11.10	0.21
Dasyhelea sp.	8	22.20	0.41
Diamesa sp.			
Dicranota sp.			
Dicrotendipes sp.	8	22.20	0.41
Dixella sp.	8	22.20	0.41
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	4	11.10	0.21
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.	8	22.20	0.41
Metriocnemus sp.			
Micropsectra sp.	4	11.10	0.21

RC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.			
Paramerina sp.	8	22.20	0.41
Paraphaenocladius sp.			
Paratanytarsus sp.	20	55.51	1.04
Paratendipes sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.	8	22.20	0.41
Pseudochironomus sp.	4	11.10	0.21
Pseudodiamesa sp.			
Pseudolimnophila sp.	4	11.10	0.21
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex	468	1298.93	24.22
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.	4	11.10	0.21
Thienemannimyia group	8	22.20	0.41
Tipula sp.			
Tvetenia sp.			
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	4	11.10	0.21
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	8	22.20	0.41
Totals:	1932	5362.27	100.00

Total Density (N/m^2)	5362
Total Number of Taxa	44
Diversity (d)	3.71

Community Parameters	Kick Sample
Total Density (N/m^2)	5362
Diversity (d)	3.71
Total Number of Taxa	44
% Dominant Taxon	24.22
EPT Richness 5/0/3	8
EPT (abundance)	2153.79
Chiron (abundance)	244.24
EPT/Chironomid ratio	8.82
Scraper (abundance)	177.63
Filterer (abundance)	1498.77
SC/F ratio	0.12
Shredder (abundance)	33.31
SH/Total ratio	0.01
HBI	5.79
ICI	40

Relative Abundance by Order	
TURBELLARIA	6.00
NEMATODA	0.00
OLIGOCHAETA	4.55
HIRUDINEA	0.41
AMPHIPODA	7.66
DECAPODA	0.00
ACARI	0.21
COLEMBOLA	0.00
EPHEMEROPTERA	36.02
ODONATA	1.66
PLECOPTERA	0.00
HEMIPTERA	0.62
TRICHOPTERA	4.14
COLEOPTERA	6.63
DIPTERA	31.47
GASTROPODA	0.21
BIVALVIA	0.41
Totals:	100.00

Density by Order	
TURBELLARIA	322
NEMATODA	0
OLIGOCHAETA	244
HIRUDINEA	22
AMPHIPODA	411
DECAPODA	0
ACARI	11
COLEMBOLA	0
EPHEMEROPTERA	1932
ODONATA	89
PLECOPTERA	0
HEMIPTERA	33
TRICHOPTERA	222
COLEOPTERA	355
DIPTERA	1688
GASTROPODA	11
BIVALVIA	22
Totals:	5362

Sample Date: 19 October 2001

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	16	38.81	0.35
NEMATODA			
OLIGOCHAETA			
Dero (Dero) nivea	60	145.53	1.30
Enchytraeidae	84	203.74	1.82
Lumbricidae			
Nais communis	168	407.48	3.64
Nais elinguis			
Nais simplex			
Nais variabilis			
Pristina aequiseta	16	38.81	0.35
Tubificidae with hair chaetae	44	106.72	0.95
Tubificidae without hair chaetae	20	48.51	0.43
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis	4	9.70	0.09
Mooreobdella fervida			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	8	19.40	0.17
DECAPODA			
Orconectes sp.			
ACARI			
Hygrobates sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	8	19.40	0.17
Caenis bajaensis			
Callibaetis sp.	108	261.95	2.34
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Capnura wanica	1348	3269.57	29.20
HEMIPTERA			
Corixidae larvae			
Corisella inscripta			
Corisella tarsalis			
Microvelia cerifera			
Notonecta kirbyi			
Sigara grossolineata			
Trichocorixa borealis			

RC3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.	24	58.21	0.52
Hydropsyche sp.	8	19.40	0.17
Hydroptila sp.			
Limnephilidae	68	164.93	1.47
Limnephilus sp.	92	223.15	1.99
COLEOPTERA			
Ababus disintegratus adult			
Agabus minnesotensis adult			
Agabus semivittatus adult			
Agabus sp. larvae	32	77.62	0.69
Anacaena sp. adult			
Colymbetinae larvae	28	67.91	0.61
Gymnochthebius falli adult			
Haliplus immaculicollis adult	4	9.70	0.09
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydroporinae larvae	12	29.11	0.26
Laccophilus proximus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult and larvae			
Rhantus gutticollis adult	4	9.70	0.09
Sanfilippodytes sp. adult			
Tropisternus lateralis adult			
Tropisternus sublaevis adult	4	9.70	0.09
DIPTERA			
Brillia sp.	60	145.53	1.30
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.	4	9.70	0.09
Chironomus sp.	48	116.42	1.04
Clinocera sp.	8	19.40	0.17
Corynoneura sp.	120	291.06	2.60
Cricotopus sp.	32	77.62	0.69
Cryptochironomus sp.			
Dasyhelea sp.	4	9.70	0.09
Diamesa sp.			
Dicranota sp.	12	29.11	0.26
Dicrotendipes sp.	16	38.81	0.35
Dixella sp.			
Dolichopodidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	20	48.51	0.43
Hemerodromia sp.			
Heterotrissocladius sp.	4	9.70	0.09
Hydrobaenus sp.			
Limnophila sp.			
Limnophora sp.			
Limnophyes sp.	40	97.02	0.87
Metriocnemus sp.	4	9.70	0.09
Micropsectra sp.	1088	2638.94	23.57

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Pagastia sp.	12	29.11	0.26
Paramerina sp.	12	29.11	0.26
Paraphaenocladius sp.	8	19.40	0.17
Paratanytarsus sp.	12	29.11	0.26
Paratendipes sp.			
Phaenopsectra sp.	276	669.44	5.98
Polypedilum sp.			
Procladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	8	19.40	0.17
Ptychoptera sp.			
Radotanypus submarginella	4	9.70	0.09
Rheocricotopus sp.	104	252.25	2.25
Simulium vittatum complex	348	844.07	7.54
Stictochironomus sp.	4	9.70	0.09
Tanytarsus sp.			
Thienemanniella sp.	24	58.21	0.52
Thienemannimyia group	12	29.11	0.26
Tipula sp.			
Tvetenia sp.	4	9.70	0.09
GASTROPODA			
Fossaria bulimoides			
Gyraulus sp.	24	58.21	0.52
Lymnaeidae	40	97.02	0.87
Physa sp.	104	252.25	2.25
Planorbidae			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	4616	11196.11	100.00

Total Density (N/m^2)	11196
Total Number of Taxa	52
Diversity (d)	3.68

RC3

Community Parameters	Kick Sample
Total Density (N/m^2)	11196
Diversity (d)	3.68
Total Number of Taxa	52
% Dominant Taxon	29.20
EPT Richness 2/1/4	7
EPT (abundance)	4016.63
Chiron (abundance)	4647.26
EPT/Chironomid ratio	0.86
Scraper (abundance)	1076.92
Filterer (abundance)	863.48
SC/F ratio	1.25
Shredder (abundance)	3939.01
SH/Total ratio	0.35
HBI	5.26
ICI	38

Relative Abundance by Order	
TURBELLARIA	0.35
NEMATODA	0.00
OLIGOCHAETA	8.49
HIRUDINEA	0.09
AMPHIPODA	0.17
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	2.51
ODONATA	0.00
PLECOPTERA	29.20
HEMIPTERA	0.00
TRICHOPTERA	4.16
COLEOPTERA	1.82
DIPTERA	49.57
GASTROPODA	3.64
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	39
NEMATODA	0
OLIGOCHAETA	951
HIRUDINEA	10
AMPHIPODA	19
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	281
ODONATA	0
PLECOPTERA	3270
HEMIPTERA	0
TRICHOPTERA	466
COLEOPTERA	204
DIPTERA	5550
GASTROPODA	407
BIVALVIA	0
Totals:	11196

APPENDIX E

2002 MACROINVERTEBRATE COMMUNITY DATA

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS
2001-2002 Summary of Invertebrate Community Index (ICI) Results

	Study Site											
	Walnut Creek					Woman Creek			Rock Creek			
	WC1	WC2	WC3	WC4	WC5	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
Summer 2001												
Total Score	22	18	32	16	14	14	10	dry	20		20	20
Biological Condition Category	fair	fair	fair	fair	fair	fair	poor		fair		fair	fair
Fall 2001												
Total Score	20	14	38	16	14	40	20	2	22		40	38
Biological Condition Category	fair	fair	good	fair	fair	good	fair	poor	fair		good	good
Spring 2002												
Total Score	20	26	20	dry	dry	34	32	24	28	30	34	28
Biological Condition Category	fair	fair	fair			fair	fair	fair	fair	fair	fair	fair
Summer 2002												
Total Score	14	14	26	dry	dry	10	6	dry	24	2	6	dry
Biological Condition Category	fair	fair	fair			poor	poor		fair	poor	poor	
Fall 2002												
Total Score	22	18	32	16	14	14	10	0	20	32	20	20
Biological Condition Category	fair	fair	fair	fair	fair	fair	poor	poor	fair	fair	fair	fair

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SPRING 2002

DENSITY

Density by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0	0	0		
NEMATODA	0	0	0	dry	dry
OLIGOCHAETA	6	330	67		
HIRUDINEA	0	13	76		
AMPHIPODA	38	1092	825		
DECAPODA	0	0	2		
ACARI	0	0	0		
COLEMBOLA	0	0	0		
EPHEMEROPTERA	0	38	547		
ODONATA	70	495	76		
PLECOPTERA	0	0	0		
HEMIPTERA	0	13	0		
TRICHOPTERA	8	16	118		
COLEOPTERA	10	140	25		
DIPTERA	546	13589	10140		
GASTROPODA	0	216	8		
BIVALVIA	4	191	0		
Total	682	16132	11886		

Density by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	0	0	19	152	133	22	0
NEMATODA	0	0	0	168	0	0	0
OLIGOCHAETA	278	1121	349	1824	5129	1488	815
HIRUDINEA	14	0	0	0	22	14	0
AMPHIPODA	111	144	0	376	488	555	0
DECAPODA	0	0	0	0	0	3	0
ACARI	0	0	0	48	0	67	0
COLEMBOLA	22	11	0	0	22	0	0
EPHEMEROPTERA	3564	977	951	896	4929	1621	951
ODONATA	339	377	19	64	755	200	0
PLECOPTERA	0	0	0	0	0	0	10
HEMIPTERA	0	0	19	0	0	44	0
TRICHOPTERA	89	33	0	152	67	344	29
COLEOPTERA	111	56	352	0	89	89	87
DIPTERA	10347	4152	7141	5952	12079	1976	8150
GASTROPODA	0	22	19	96	111	44	0
BIVALVIA	78	44	0	184	133	22	0
Total	14952	6939	8870	9912	23958	6489	10042

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SPRING 2002

RELATIVE ABUNDANCE

Relative Abundance by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0.00	0.00	0.00		
NEMATODA	0.00	0.00	0.00	dry	dry
OLIGOCHAETA	0.88	2.05	0.57		
HIRUDINEA	0.00	0.08	0.64		
AMPHIPODA	5.57	6.77	6.94		
DECAPODA	0.00	0.00	0.02		
ACARI	0.00	0.00	0.00		
COLEMBOLA	0.00	0.00	0.00		
EPHEMEROPTERA	0.00	0.24	4.61		
ODONATA	10.26	3.07	0.64		
PLECOPTERA	0.00	0.00	0.00		
HEMIPTERA	0.00	0.08	0.00		
TRICHOPTERA	1.17	0.10	0.99		
COLEOPTERA	1.47	0.87	0.21		
DIPTERA	80.06	84.24	85.31		
GASTROPODA	0.00	1.34	0.07		
BIVALVIA	0.59	1.18	0.00		
Total	100.00	100.00	100.00		

Relative Abundance by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	0.00	0.00	0.22	1.53	0.56	0.34	0.00
NEMATODA	0.00	0.00	0.00	1.69	0.00	0.00	0.00
OLIGOCHAETA	1.86	16.16	3.94	18.40	21.41	22.93	8.12
HIRUDINEA	0.09	0.00	0.00	0.00	0.09	0.21	0.00
AMPHIPODA	0.74	2.08	0.00	3.79	2.04	8.55	0.00
DECAPODA	0.00	0.00	0.00	0.00	0.00	0.04	0.00
ACARI	0.00	0.00	0.00	0.48	0.00	1.03	0.00
COLEMBOLA	0.15	0.16	0.00	0.00	0.09	0.00	0.00
EPHEMEROPTERA	23.84	14.08	10.72	9.04	20.57	24.98	9.47
ODONATA	2.26	5.44	0.22	0.65	3.15	3.08	0.00
PLECOPTERA	0.00	0.00	0.00	0.00	0.00	0.00	0.10
HEMIPTERA	0.00	0.00	0.22	0.00	0.00	0.68	0.00
TRICHOPTERA	0.59	0.48	0.00	1.53	0.28	5.30	0.29
COLEOPTERA	0.74	0.80	3.97	0.00	0.37	1.37	0.87
DIPTERA	69.20	59.84	80.50	60.05	50.42	30.45	81.16
GASTROPODA	0.00	0.32	0.22	0.97	0.46	0.68	0.00
BIVALVIA	0.52	0.64	0.00	1.86	0.56	0.34	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SPRING 2002

COMMUNITY PARAMETERS

	WC1	WC2	WC3	WC4	WC5
Total Density (N/m^2)	682	16132	11886		
Diversity (d)	3.19	3.01	2.45	dry	dry
Total Number of Taxa	29	45	33		
% Dominant Taxon	28.15	38.02	55.06		
EPT Richness	1	2	4		
EPT abundance	8.00	53.98	665.34		
Chironomid abundance	472.00	13474.70	3554.08		
Ratio of EPT to Chironomids	0.02	0.00	0.19		
Scraper abundance	4.00	304.80	8.42		
Filterer abundance	56.00	190.50	6661.80		
Ratio of Scrapers to Filterers	0.07	1.60	0.00		
Shredder abundance	18.00	549.28	1457.01		
Ratio of Shredders to Total	0.03	0.03	0.12		
HBI	6.28	8.03	6.53		
ICI	20	26	20		

	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
Total Density (N/m^2)	14952	6939	8870	9912	23958	6489	10042
Diversity (d)	2.86	4.04	3.26	3.85	3.66	4.55	3.13
Total Number of Taxa	44	43	45	38	45	61	44
% Dominant Taxon	45.15	16.96	34.89	22.36	20.85	18.99	49.76
EPT Richness	7	5	1	6	7	7	5
EPT abundance	3652.56	1010.28	950.80	1048.00	4995.90	1965.05	989.60
Chironomid abundance	9714.25	3952.31	3929.31	4232.00	10857.76	1520.97	7790.71
Ratio of EPT to Chironomids	0.38	0.26	0.24	0.25	0.46	1.29	0.13
Scraper abundance	33.31	499.59	106.72	128.00	111.02	122.12	300.76
Filterer abundance	588.41	1276.73	3094.94	2424.00	2842.11	532.90	737.35
Ratio of Scrapers to Filterers	0.06	0.39	0.03	0.05	0.04	0.23	0.41
Shredder abundance	410.77	133.22	184.34	576.00	2797.70	199.84	650.03
Ratio of Shredders to Total	0.03	0.02	0.02	0.06	0.12	0.03	0.06
HBI	5.63	6.57	6.20	6.70	7.17	7.19	5.19
ICI	34	32	24	28	30	34	28

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2002

DENSITY

Density by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0	0	0		
NEMATODA	0	0	0	dry	dry
OLIGOCHAETA	24	488	34		
HIRUDINEA	0	178	67		
AMPHIPODA	352	7816	3723		
DECAPODA	2	0	8		
ACARI	0	0	17		
COLEMBOLA	8	0	17		
EPHEMEROPTERA	0	977	2746		
ODONATA	104	136	34		
PLECOPTERA	0	0	0		
HEMIPTERA	16	0	17		
TRICHOPTERA	0	0	1348		
COLEOPTERA	8	89	17		
DIPTERA	1856	7372	152		
GASTROPODA	32	2087	17		
BIVALVIA	16	89	0		
Total	2418	19231	8195		

Density by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	0	0		48	2157	0	
NEMATODA	0	0	dry	0	0	0	dry
OLIGOCHAETA	3984	1048		80	1137	7264	
HIRUDINEA	96	0		0	0	76	
AMPHIPODA	112	864		920	5083	559	
DECAPODA	0	0		0	0	3	
ACARI	0	0		64	0	0	
COLEMBOLA	0	0		0	0	0	
EPHEMEROPTERA	80	0		136	0	25	
ODONATA	96	12		64	502	3	
PLECOPTERA	0	0		0	0	0	
HEMIPTERA	0	0		24	0	25	
TRICHOPTERA	48	0		120	0	0	
COLEOPTERA	0	24		16	201	356	
DIPTERA	192	496		424	351	25	
GASTROPODA	96	8		48	167	51	
BIVALVIA	64	80		464	117	0	
Total	4768	2532		2408	9714	8388	

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2002

RELATIVE ABUNDANCE

Relative Abundance by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0.00	0.00	0.00		
NEMATODA	0.00	0.00	0.00	dry	dry
OLIGOCHAETA	0.99	2.54	0.41		
HIRUDINEA	0.00	0.92	0.82		
AMPHIPODA	14.56	40.64	45.43		
DECAPODA	0.08	0.00	0.10		
ACARI	0.00	0.00	0.21		
COLEMBOLA	0.33	0.00	0.21		
EPHEMEROPTERA	0.00	5.08	33.50		
ODONATA	4.30	0.71	0.41		
PLECOPTERA	0.00	0.00	0.00		
HEMIPTERA	0.66	0.00	0.21		
TRICHOPTERA	0.00	0.00	16.44		
COLEOPTERA	0.33	0.46	0.21		
DIPTERA	76.76	38.33	1.85		
GASTROPODA	1.32	10.85	0.21		
BIVALVIA	0.66	0.46	0.00		
Total	100.00	100.00	100.00		

Relative Abundance by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	0.00	0.00		1.99	22.20	0.00	
NEMATODA	0.00	0.00	dry	0.00	0.00	0.00	dry
OLIGOCHAETA	83.56	41.39		3.32	11.70	86.60	
HIRUDINEA	2.01	0.00		0.00	0.00	0.91	
AMPHIPODA	2.35	34.12		38.21	52.32	6.66	
DECAPODA	0.00	0.00		0.00	0.00	0.04	
ACARI	0.00	0.00		2.66	0.00	0.00	
COLEMBOLA	0.00	0.00		0.00	0.00	0.00	
EPHEMEROPTERA	1.68	0.00		5.65	0.00	0.30	
ODONATA	2.01	0.47		2.66	5.16	0.04	
PLECOPTERA	0.00	0.00		0.00	0.00	0.00	
HEMIPTERA	0.00	0.00		1.00	0.00	0.30	
TRICHOPTERA	1.01	0.00		4.98	0.00	0.00	
COLEOPTERA	0.00	0.95		0.66	2.07	4.24	
DIPTERA	4.03	19.59		17.61	3.61	0.30	
GASTROPODA	2.01	0.32		1.99	1.72	0.61	
BIVALVIA	1.34	3.16		19.27	1.20	0.00	
Total	100.00	100.00		100.00	100.00	100.00	

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS SUMMER 2002

COMMUNITY PARAMETERS

	WC1	WC2	WC3	WC4	WC5
Total Density (N/m^2)	2418	19231	8195		
Diversity (d)	2.92	3.23	2.23	dry	dry
Total Number of Taxa	26	30	24		
% Dominant Taxon	42.35	40.64	45.43		
EPT Richness	0	1	7		
EPT abundance	0.00	976.98	4093.09		
Chironomid abundance	1800.00	6972.06	67.38		
Ratio of EPT to Chironomids	0.00	0.14	60.75		
Scraper abundance	208.00	2220.40	16.84		
Filterer abundance	16.00	266.45	1414.90		
Ratio of Scrapers to Filterers	13.00	8.33	0.01		
Shredder abundance	8.00	843.75	16.84		
Ratio of Shredders to Total	0.00	0.04	0.00		
HBI	7.26	7.65	6.42		
ICI	14	14	26		

	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
Total Density (N/m^2)	4768	2532		2408	9714	8388	
Diversity (d)	1.59	2.73	dry	3.40	2.23	1.92	dry
Total Number of Taxa	20	22		33	19	20	
% Dominant Taxon	78.52	35.39		38.21	52.32	61.47	
EPT Richness	2	0		5	0	1	
EPT abundance	128.00	0.00		256.00	0.00	25.40	
Chironomid abundance	144.00	496.00		288.00	351.12	25.40	
Ratio of EPT to Chironomids	0.89	0.00		0.89	0.00	1.00	
Scraper abundance	96.00	56.00		48.00	234.08	76.20	
Filterer abundance	128.00	168.00		496.00	117.04	0.00	
Ratio of Scrapers to Filterers	0.75	0.33		0.10	2.00	n/a	
Shredder abundance	16.00	0.00		136.00	0.00	25.40	
Ratio of Shredders to Total	0.00	0.00		0.06	0.00	0.00	
HBI	9.53	6.91		7.14	7.08	9.47	
ICI	10	6		24	2	6	

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2002

DENSITY

Density by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	8	0	0	0	0
NEMATODA	0	0	0	0	0
OLIGOCHAETA	1664	122	76	24	1392
HIRUDINEA	0	33	0	0	0
AMPHIPODA	272	1166	1204	0	0
DECAPODA	0	0	0	0	0
ACARI	0	0	59	0	0
COLEMBOLA	0	0	0	0	0
EPHEMEROPTERA	176	100	1558	0	16
ODONATA	96	211	32	0	0
PLECOPTERA	0	0	0	0	0
HEMIPTERA	0	33	0	1628	17328
TRICHOPTERA	72	33	632	4	0
COLEOPTERA	56	111	25	0	0
DIPTERA	944	788	3049	0	16
GASTROPODA	416	2387	0	0	0
BIVALVIA	80	233	8	0	0
Total	3784	5218	6643	1656	18752

Density by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	58	0	0	116	888	19	0
NEMATODA	0	0	0	0	0	0	0
OLIGOCHAETA	2096	2560	181	472	1887	2134	471
HIRUDINEA	0	0	0	16	22	0	0
AMPHIPODA	10	17	0	276	555	0	0
DECAPODA	0	0	0	0	0	0	0
ACARI	0	0	0	36	178	78	0
COLEMBOLA	0	0	2	4	0	0	0
EPHEMEROPTERA	49	0	0	100	3020	757	2525
ODONATA	49	0	0	0	422	39	0
PLECOPTERA	19	0	0	0	0	0	1840
HEMIPTERA	0	0	0	4	0	80	43
TRICHOPTERA	0	51	0	72	178	78	0
COLEOPTERA	184	202	6	8	244	349	257
DIPTERA	1261	1920	0	216	1399	3299	30902
GASTROPODA	485	152	0	76	133	78	0
BIVALVIA	49	168	0	80	799	0	0
Total	4259	5070	189	1476	9725	6910	36038

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2002

RELATIVE ABUNDANCE

Relative Abundance by Order	WC1	WC2	WC3	WC4	WC5
TURBELLARIA	0.21	0.00	0.00	0.00	0.00
NEMATODA	0.00	0.00	0.00	0.00	0.00
OLIGOCHAETA	43.97	2.34	1.14	1.45	7.42
HIRUDINEA	0.00	0.64	0.00	0.00	0.00
AMPHIPODA	7.19	22.34	18.13	0.00	0.00
DECAPODA	0.00	0.00	0.00	0.00	0.00
ACARI	0.00	0.00	0.89	0.00	0.00
COLEMBOLA	0.00	0.00	0.00	0.00	0.00
EPHEMEROPTERA	4.65	1.91	23.45	0.00	0.09
ODONATA	2.54	4.04	0.48	0.00	0.00
PLECOPTERA	0.00	0.00	0.00	0.00	0.00
HEMIPTERA	0.00	0.64	0.00	98.31	92.41
TRICHOPTERA	1.90	0.64	9.51	0.24	0.00
COLEOPTERA	1.48	2.13	0.38	0.00	0.00
DIPTERA	24.95	15.11	45.90	0.00	0.09
GASTROPODA	10.99	45.74	0.00	0.00	0.00
BIVALVIA	2.11	4.47	0.13	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00

Relative Abundance by Order	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
TURBELLARIA	1.37	0.00	0.00	7.86	9.13	0.28	0.00
NEMATODA	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OLIGOCHAETA	49.20	50.50	95.55	31.98	19.41	30.89	1.31
HIRUDINEA	0.00	0.00	0.00	1.08	0.23	0.00	0.00
AMPHIPODA	0.23	0.33	0.00	18.70	5.71	0.00	0.00
DECAPODA	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ACARI	0.00	0.00	0.00	2.44	1.83	1.12	0.00
COLEMBOLA	0.00	0.00	1.11	0.27	0.00	0.00	0.00
EPHEMEROPTERA	1.14	0.00	0.00	6.78	31.05	10.95	7.01
ODONATA	1.14	0.00	0.00	0.00	4.34	0.56	0.00
PLECOPTERA	0.46	0.00	0.00	0.00	0.00	0.00	5.11
HEMIPTERA	0.00	0.00	0.00	0.27	0.00	1.16	0.12
TRICHOPTERA	0.00	1.00	0.00	4.88	1.83	1.12	0.00
COLEOPTERA	4.33	3.99	3.33	0.54	2.51	5.05	0.71
DIPTERA	29.61	37.87	0.00	14.63	14.38	47.74	85.75
GASTROPODA	11.39	2.99	0.00	5.15	1.37	1.12	0.00
BIVALVIA	1.14	3.32	0.00	5.42	8.22	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

MACROINVERTEBRATE DATA SUMMARY
WALNUT, WOMAN AND ROCK CREEKS FALL 2002

COMMUNITY PARAMETERS

	WC1	WC2	WC3	WC4	WC5
Total Density (N/m^2)	3784	5218	6643	1656	18752
Diversity (d)	3.94	3.01	2.90	0.13	0.48
Total Number of Taxa	43	40	32	3	10
% Dominant Taxon	31.92	45.74	32.71	98.31	92.06
EPT Richness	4	2	8	1	1
EPT abundance	248.00	133.22	2189.72	4.00	16.00
Chironomid abundance	688.00	643.92	842.20	0.00	16.00
Ratio of EPT to Chironomids	0.36	0.21	2.60	n/a	1.00
Scraper abundance	432.00	2409.13	8.42	0.00	0.00
Filterer abundance	272.00	355.26	2812.95	0.00	0.00
Ratio of Scrapers to Filterers	1.59	6.78	0.00	0.00	0.00
Shredder abundance	120.00	88.82	143.17	4.00	0.00
Ratio of Shredders to Total	0.03	0.02	0.02	0.00	0.00
HBI	8.31	7.76	6.28	5.07	5.39
ICI	22	18	32	16	14

	WO1	WO2	WO3	RC1	RC1M	RC2	RC3
Total Density (N/m^2)	4259	5070	189	1476	9725	6910	36038
Diversity (d)	3.47	2.56	1.69	3.62	4.10	4.23	3.71
Total Number of Taxa	32	20	6	32	50	42	38
% Dominant Taxon	24.60	43.85	44.44	28.18	24.89	16.85	28.50
EPT Richness	3	1	0	4	5	3	3
EPT abundance	67.91	50.53	0.00	172.00	3197.38	834.37	4365.60
Chironomid abundance	892.58	1903.37	0.00	124.00	821.55	2580.73	30131.20
Ratio of EPT to Chironomids	0.08	0.03	0.00	1.39	3.89	0.32	0.14
Scraper abundance	582.12	151.60	0.00	76.00	177.63	368.68	642.00
Filterer abundance	135.83	168.44	0.00	104.00	1376.65	931.39	342.40
Ratio of Scrapers to Filterers	4.29	0.90	0.00	0.73	0.13	0.40	1.88
Shredder abundance	38.81	50.53	0.00	96.00	177.63	271.66	3980.40
Ratio of Shredders to Total	0.01	0.01	0.00	0.07	0.02	0.04	0.11
HBI	8.01	6.05	9.83	7.66	7.03	8.01	6.93
ICI	14	10	0	20	32	20	20

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	2	4.00	0.59
Nais communis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	1	2.00	0.29
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	19	38.00	5.57
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Centroptilum sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	35	70.00	10.26
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

WC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.	4	8.00	1.17
COLEOPTERA			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae	1	2.00	0.29
Cymbiodyta sp. adult	1	2.00	0.29
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult	1	2.00	0.29
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	2	4.00	0.59
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	6	12.00	1.76
Chaetocladius sp.	2	4.00	0.59
Chironomus sp.			
Corynoneura sp.	3	6.00	0.88
Cricotopus sp.	1	2.00	0.29
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae	1	2.00	0.29
Ephydridae			
Eukiefferiella sp.			
Euparyphus sp.			
Heleniella sp.	2	4.00	0.59
Hemerodromia sp.	1	2.00	0.29
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.			

WC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.	27	54.00	7.92
Nanocladius sp.			
Nilotanypus sp.	88	176.00	25.81
Odontomesa sp.	3	6.00	0.88
Orthocladiinae	2	4.00	0.59
Orthocladius sp.			
Pagastia sp.			
Paramerina sp.	6	12.00	1.76
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.	2	4.00	0.59
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.	1	2.00	0.29
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	3	6.00	0.88
Simulium vittatum complex	26	52.00	7.62
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	96	192.00	28.15
Tipula sp.	2	4.00	0.59
Tipulidae			
Tvetenia sp.	1	2.00	0.29
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	2	4.00	0.59
Totals:	341	682.00	100.00

Total Density (N/m^2)	682
Total Number of Taxa	29
Diversity (d)	3.19

Community Parameters	Kick Sample
Total Density (N/m^2)	682
Diversity (d)	3.19
Total Number of Taxa	29
% Dominant Taxon	28.15
EPT Richness 0/0/1	1
EPT (abundance)	8.00
Chiron (abundance)	472.00
EPT/Chironomid ratio	0.02
Scraper (abundance)	4.00
Filterer (abundance)	56.00
SC/F ratio	0.07
Shredder (abundance)	18.00
SH/Total ratio	0.03
HBI	6.28
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	0.88
HIRUDINEA	0.00
AMPHIPODA	5.57
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	10.26
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.17
COLEOPTERA	1.47
DIPTERA	80.06
GASTROPODA	0.00
BIVALVIA	0.59
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	6
HIRUDINEA	0
AMPHIPODA	38
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	70
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	8
COLEOPTERA	10
DIPTERA	546
GASTROPODA	0
BIVALVIA	4
Totals:	682

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	12	38.10	0.24
Lumbricidae	16	50.80	0.31
Nais communis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	32	101.60	0.63
Tubificidae without hair chaetae	44	139.70	0.87
HIRUDINEA			
Erpobdellidae	4	12.70	0.08
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	344	1092.20	6.77
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	12	38.10	0.24
Centroptilum sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	12	38.10	0.24
Coenagrionidae	112	355.60	2.20
Enallagma sp.			
Ischnura sp.	32	101.60	0.63
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata	4	12.70	0.08
Sigara grossolineata			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.	5	15.88	0.10
COLEOPTERA			
Agabus sp. larvae	16	50.80	0.31
Anacaena sp. adult			
Colymbetinae larvae	8	25.40	0.16
Cymbiodyta sp. adult			
Enochrus ochraceous adult	4	12.70	0.08
Gymnochthebius falli adult	4	12.70	0.08
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae	4	12.70	0.08
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae	8	25.40	0.16
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.	68	215.90	1.34
Apedilum sp.	12	38.10	0.24
Brillia sp.			
Caloparyphus sp.	4	12.70	0.08
Ceratopogonidae	16	50.80	0.31
Chaetocladius sp.	44	139.70	0.87
Chironomus sp.	1456	4622.80	28.66
Corynoneura sp.	12	38.10	0.24
Cricotopus sp.	148	469.90	2.91
Cryptochironomus sp.	20	63.50	0.39
Dasyhelea sp.			
Diamesa sp.	4	12.70	0.08
Dicrotendipes sp.	44	139.70	0.87
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae	4	12.70	0.08
Ephydridae	4	12.70	0.08
Eukiefferiella sp.			
Euparyphus sp.	4	12.70	0.08
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.	16	50.80	0.31

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.	1932	6134.10	38.02
Nanocladius sp.			
Nilotanypus sp.			
Odontomesa sp.			
Orthocladiinae			
Orthocladius sp.			
Pagastia sp.			
Paramerina sp.	128	406.40	2.52
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	44	139.70	0.87
Paratendipes sp.	204	647.70	4.01
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.	28	88.90	0.55
Pilaria sp.			
Polypedilum sp.	16	50.80	0.31
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	36	114.30	0.71
Simulium vittatum complex			
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	32	101.60	0.63
Tipula sp.			
Tipulidae	4	12.70	0.08
Tvetenia sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	4	12.70	0.08
Physa sp.	64	203.20	1.26
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	60	190.50	1.18
Totals:	5081	16132.18	100.00

Total Density (N/m^2)	16132
Total Number of Taxa	45
Diversity (d)	3.01

WALNUT CREEK
WC2

Community Parameters	Kick Sample
Total Density (N/m^2)	16132
Diversity (d)	3.01
Total Number of Taxa	45
% Dominant Taxon	38.02
EPT Richness 1/0/1	2
EPT (abundance)	53.98
Chiron (abundance)	13474.70
EPT/Chironomid ratio	0.00
Scraper (abundance)	304.80
Filterer (abundance)	190.50
SC/F ratio	1.60
Shredder (abundance)	549.28
SH/Total ratio	0.03
HBI	8.03
ICI	26

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	2.05
HIRUDINEA	0.08
AMPHIPODA	6.77
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.24
ODONATA	3.07
PLECOPTERA	0.00
HEMIPTERA	0.08
TRICHOPTERA	0.10
COLEOPTERA	0.87
DIPTERA	84.24
GASTROPODA	1.34
BIVALVIA	1.18
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	330
HIRUDINEA	13
AMPHIPODA	1092
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	38
ODONATA	495
PLECOPTERA	0
HEMIPTERA	13
TRICHOPTERA	16
COLEOPTERA	140
DIPTERA	13589
GASTROPODA	216
BIVALVIA	191
Totals:	16132

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	16	33.69	0.28
Tubificidae without hair chaetae	16	33.69	0.28
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida	36	75.80	0.64
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	392	825.36	6.94
DECAPODA			
Orconectes sp.	1	2.11	0.02
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus	244	513.74	4.32
Caenis bajaensis			
Callibaetis sp.	16	33.69	0.28
Centroptilum sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	8	16.84	0.14
Coenagrionidae	16	33.69	0.28
Enallagma sp.	4	8.42	0.07
Ischnura sp.	8	16.84	0.14
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	48	101.06	0.85
Hesperophylax sp.			
Hydropsyche sp.	8	16.84	0.14
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.			
COLEOPTERA			
Agabus sp. larvae	4	8.42	0.07
Anacaena sp. adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult	4	8.42	0.07
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae	4	8.42	0.07
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	12	25.27	0.21
Chaetocladius sp.			
Chironomus sp.	44	92.64	0.78
Corynoneura sp.			
Cricotopus sp.	692	1457.01	12.26
Cryptochironomus sp.	4	8.42	0.07
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	48	101.06	0.85
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae	4	8.42	0.07
Ephydridae			
Eukiefferiella sp.	528	1111.70	9.35
Euparyphus sp.			
Heleniella sp.			
Hemerodromia sp.	4	8.42	0.07
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.	212	446.37	3.76
Nanocladius sp.	4	8.42	0.07
Nilotanypus sp.			
Odontomesa sp.			
Orthocladiinae			
Orthocladius sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.	60	126.33	1.06
Paraphaenocladius sp.			
Paratanytarsus sp.	4	8.42	0.07
Paratendipes sp.	36	75.80	0.64
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Simulium vittatum complex	3108	6543.89	55.06
Simulium sp.			
Stictochironomus sp.	16	33.69	0.28
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
Tipulidae			
Tvetenia sp.	40	84.22	0.71
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	4	8.42	0.07
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	5645	11885.55	100.00

Total Density (N/m^2)	11886
Total Number of Taxa	33
Diversity (d)	2.45

Community Parameters	Kick Sample
Total Density (N/m^2)	11886
Diversity (d)	2.45
Total Number of Taxa	33
% Dominant Taxon	55.06
EPT Richness 2/0/2	4
EPT (abundance)	665.34
Chiron (abundance)	3554.08
EPT/Chironomid ratio	0.19
Scraper (abundance)	8.42
Filterer (abundance)	6661.80
SC/F ratio	0.00
Shredder (abundance)	1457.01
SH/Total ratio	0.12
HBI	6.53
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	0.57
HIRUDINEA	0.64
AMPHIPODA	6.94
DECAPODA	0.02
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	4.61
ODONATA	0.64
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	0.99
COLEOPTERA	0.21
DIPTERA	85.31
GASTROPODA	0.07
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	67
HIRUDINEA	76
AMPHIPODA	825
DECAPODA	2
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	547
ODONATA	76
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	118
COLEOPTERA	25
DIPTERA	10140
GASTROPODA	8
BIVALVIA	0
Totals:	11886

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	12	33.31	0.22
Nais communis	4	11.10	0.07
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	84	233.14	1.56
HIRUDINEA			
Erpobdellidae	5	13.88	0.09
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.	20	55.51	0.37
Hyalella azteca	20	55.51	0.37
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA	8	22.20	0.15
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus	16	44.41	0.30
Baetis sp.			
Baetis tricaudatus	24	66.61	0.45
Caenis bajaensis	1232	3419.42	22.87
Callibaetis sp.			
Centroptilum sp.			
Fallceon quilleri	12	33.31	0.22
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.	2	5.55	0.04
Amphiagrion abbreviatum	4	11.10	0.07
Argia sp.	104	288.65	1.93
Coenagrionidae	12	33.31	0.22
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

WO1 (Continued)

Taxon	Kick Sample n	N/m²	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	12	33.31	0.22
Hesperophylax sp.	4	11.10	0.07
Hydropsyche sp.	16	44.41	0.30
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.			
COLEOPTERA			
Agabus sp. larvae	4	11.10	0.07
Anacaena sp. adult	4	11.10	0.07
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	12	33.31	0.22
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae	20	55.51	0.37
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	128	355.26	2.38
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.	120	333.06	2.23
Cricotopus sp.	128	355.26	2.38
Cryptochironomus sp.	40	111.02	0.74
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixa sp.			
Dixella sp.			
Dixidae	4	11.10	0.07
Empididae	4	11.10	0.07
Ephydridae			
Eukiefferiella sp.	4	11.10	0.07
Euparyphus sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.	40	111.02	0.74
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.	4	11.10	0.07

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.	16	44.41	0.30
Odontomesa sp.	2432	6750.02	45.15
Orthocladiinae			
Orthocladius sp.	4	11.10	0.07
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.	8	22.20	0.15
Paratanytarsus sp.			
Paratendipes sp.	376	1043.59	6.98
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.	8	22.20	0.15
Polypedilum sp.			
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	204	566.20	3.79
Simulium vittatum complex	68	188.73	1.26
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.	88	244.24	1.63
Thienemanniella sp.	4	11.10	0.07
Thienemannimyia group	32	88.82	0.59
Tipula sp.	16	44.41	0.30
Tipulidae			
Tvetenia sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	28	77.71	0.52
Totals:	5387	14951.62	100.00

Total Density (N/m^2)	14952
Total Number of Taxa	44
Diversity (d)	2.86

Community Parameters	Kick Sample
Total Density (N/m^2)	14952
Diversity (d)	2.86
Total Number of Taxa	44
% Dominant Taxon	45.15
EPT Richness 4/0/3	7
EPT (abundance)	3652.56
Chiron (abundance)	9714.25
EPT/Chironomid ratio	0.38
Scraper (abundance)	33.31
Filterer (abundance)	588.41
SC/F ratio	0.06
Shredder (abundance)	410.77
SH/Total ratio	0.03
HBI	5.63
ICI	34

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	1.86
HIRUDINEA	0.09
AMPHIPODA	0.74
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.15
EPHEMEROPTERA	23.84
ODONATA	2.26
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	0.59
COLEOPTERA	0.74
DIPTERA	69.20
GASTROPODA	0.00
BIVALVIA	0.52
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	278
HIRUDINEA	14
AMPHIPODA	111
DECAPODA	0
ACARI	0
COLEMBOLA	22
EPHEMEROPTERA	3564
ODONATA	339
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	89
COLEOPTERA	111
DIPTERA	10347
GASTROPODA	0
BIVALVIA	78
Totals:	14952

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea	16	44.41	0.64
Enchytraeidae			
Lumbricidae	4	11.10	0.16
Nais communis	312	865.96	12.48
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	20	55.51	0.80
Tubificidae without hair chaetae	52	144.33	2.08
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.	20	55.51	0.80
Hyalella azteca	32	88.82	1.28
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA	4	11.10	0.16
EPHEMEROPTERA			
Baetis flavistriga	40	111.02	1.60
Baetis magnus			
Baetis sp.	24	66.61	0.96
Baetis tricaudatus			
Caenis bajaensis	288	799.34	11.52
Callibaetis sp.			
Centroptilum sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.	4	11.10	0.16
Amphiagrion abbreviatum			
Argia sp.	112	310.86	4.48
Coenagrionidae	20	55.51	0.80
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.	8	22.20	0.32
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.	4	11.10	0.16
COLEOPTERA			
Agabus sp. larvae	4	11.10	0.16
Anacaena sp. adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult	8	22.20	0.32
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult			
Laccophilus maculosus decipiens adult	4	11.10	0.16
Liodessus abjectus adult			
Neoporus dimidiatus adult	4	11.10	0.16
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.	4	11.10	0.16
Caloparyphus sp.			
Ceratopogonidae	28	77.71	1.12
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.	56	155.43	2.24
Cricotopus sp.	12	33.31	0.48
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	52	144.33	2.08
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	4	11.10	0.16
Euparyphus sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.	20	55.51	0.80

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.			
Odontomesa sp.	424	1176.81	16.96
Orthocladiinae			
Orthocladius sp.			
Pagastia sp.	20	55.51	0.80
Paramerina sp.			
Parametriocnemus sp.	16	44.41	0.64
Paraphaenocladius sp.			
Paratanytarsus sp.	44	122.12	1.76
Paratendipes sp.	80	222.04	3.20
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.	172	477.39	6.88
Pilaria sp.			
Polypedilum sp.	12	33.31	0.48
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	80	222.04	3.20
Simulium vittatum complex	36	99.92	1.44
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.	408	1132.40	16.32
Thienemanniella sp.			
Thienemannimyia group	8	22.20	0.32
Tipula sp.	8	22.20	0.32
Tipulidae			
Tvetenia sp.	12	33.31	0.48
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.	4	11.10	0.16
Lymnaeidae			
Physa sp.	4	11.10	0.16
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	16	44.41	0.64
Totals:	2500	6938.75	100.00

Total Density (N/m^2)	6939
Total Number of Taxa	43
Diversity (d)	4.04

Community Parameters	Kick Sample
Total Density (N/m^2)	6939
Diversity (d)	4.04
Total Number of Taxa	43
% Dominant Taxon	16.96
EPT Richness 3/0/2	5
EPT (abundance)	1010.28
Chiron (abundance)	3952.31
EPT/Chironomid ratio	0.26
Scraper (abundance)	499.59
Filterer (abundance)	1276.73
SC/F ratio	0.39
Shredder (abundance)	133.22
SH/Total ratio	0.02
HBI	6.57
ICI	32

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	16.16
HIRUDINEA	0.00
AMPHIPODA	2.08
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.16
EPHEMEROPTERA	14.08
ODONATA	5.44
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	0.48
COLEOPTERA	0.80
DIPTERA	59.84
GASTROPODA	0.32
BIVALVIA	0.64
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1121
HIRUDINEA	0
AMPHIPODA	144
DECAPODA	0
ACARI	0
COLEMBOLA	11
EPHEMEROPTERA	977
ODONATA	377
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	33
COLEOPTERA	56
DIPTERA	4152
GASTROPODA	22
BIVALVIA	44
Totals:	6939

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	8	19.40	0.22
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	16	38.81	0.44
Lumbricidae			
Nais communis	40	97.02	1.09
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	76	184.34	2.08
Tubificidae without hair chaetae	12	29.11	0.33
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca			
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Centroptilum sp.	392	950.80	10.72
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae	8	19.40	0.22
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata	4	9.70	0.11
Sigara grossolineata	4	9.70	0.11

WO3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.			
COLEOPTERA			
Agabus sp. larvae	56	135.83	1.53
Anacaena sp. adult			
Colymbetinae larvae	32	77.62	0.88
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult	4	9.70	0.11
Haliplus immaculicollis adult	4	9.70	0.11
Haliplus sp. larvae			
Helophorus lacustris adult	4	9.70	0.11
Hydrobius fuscipes adult and larvae	24	58.21	0.66
Hydroporinae larvae	12	29.11	0.33
Laccobius sp. adult			
Laccophilus maculosus decipiens adult	4	9.70	0.11
Liodessus abjectus adult	4	9.70	0.11
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult	1	2.43	0.03
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.	200	485.10	5.47
Apedilum sp.	4	9.70	0.11
Brillia sp.	4	9.70	0.11
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.	20	48.51	0.55
Chironomus sp.	136	329.87	3.72
Corynoneura sp.	68	164.93	1.86
Cricotopus sp.	52	126.13	1.42
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixa sp.	4	9.70	0.11
Dixella sp.			
Dixidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	12	29.11	0.33
Euparyphus sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.	40	97.02	1.09
Limnophyes sp.	16	38.81	0.44

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.	4	9.70	0.11
Micropsectra sp.	816	1979.21	22.31
Nanocladius sp.			
Nilotanypus sp.			
Odontomesa sp.	16	38.81	0.44
Orthocladiinae			
Orthocladius sp.	8	19.40	0.22
Pagastia sp.	8	19.40	0.22
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.	28	67.91	0.77
Pericoma sp.			
Phaenopsectra sp.	36	87.32	0.98
Pilaria sp.			
Polypedilum sp.	12	29.11	0.33
Procladius sp.			
Psectrocladius sp.	164	397.78	4.48
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.	4	9.70	0.11
Ptychoptera sp.			
Radotanypus submarginella			
Simulium vittatum complex	1276	3094.94	34.89
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.	4	9.70	0.11
Tipulidae			
Tvetenia sp.	12	29.11	0.33
GASTROPODA			
Fossaria obrussa	4	9.70	0.11
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
Stagnicola caperata	4	9.70	0.11
BIVALVIA			
Pisidium sp.			
Totals:	3657	8870.05	100.00

Total Density (N/m^2)	8870
Total Number of Taxa	45
Diversity (d)	3.26

Community Parameters	Kick Sample
Total Density (N/m^2)	8870
Diversity (d)	3.26
Total Number of Taxa	45
% Dominant Taxon	34.89
EPT Richness 1/0/0	1
EPT (abundance)	950.80
Chiron (abundance)	3929.31
EPT/Chironomid ratio	0.24
Scraper (abundance)	106.72
Filterer (abundance)	3094.94
SC/F ratio	0.03
Shredder (abundance)	184.34
SH/Total ratio	0.02
HBI	6.20
ICI	24

Relative Abundance by Order	
TURBELLARIA	0.22
NEMATODA	0.00
OLIGOCHAETA	3.94
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	10.72
ODONATA	0.22
PLECOPTERA	0.00
HEMIPTERA	0.22
TRICHOPTERA	0.00
COLEOPTERA	3.97
DIPTERA	80.50
GASTROPODA	0.22
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	19
NEMATODA	0
OLIGOCHAETA	349
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	951
ODONATA	19
PLECOPTERA	0
HEMIPTERA	19
TRICHOPTERA	0
COLEOPTERA	352
DIPTERA	7141
GASTROPODA	19
BIVALVIA	0
Totals:	8870

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	76	152.00	1.53
NEMATODA	84	168.00	1.69
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	12	24.00	0.24
Lumbricidae			
Nais communis	44	88.00	0.89
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	244	488.00	4.92
Tubificidae without hair chaetae	612	1224.00	12.35
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	188	376.00	3.79
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.	20	40.00	0.40
Hygrobates sp.			
Lebertia sp.	4	8.00	0.08
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus	8	16.00	0.16
Caenis bajaensis	208	416.00	4.20
Callibaetis sp.			
Centroptilum sp.			
Fallceon quilleri	232	464.00	4.68
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum	4	8.00	0.08
Argia sp.	28	56.00	0.56
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.	16	32.00	0.32
Lepidostoma sp.	52	104.00	1.05
Limnephilus sp.	8	16.00	0.16
COLEOPTERA			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.			
Caloparyphus sp.	4	8.00	0.08
Ceratopogonidae	792	1584.00	15.98
Chaetocladius sp.	8	16.00	0.16
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.	16	32.00	0.32
Diamesa sp.			
Dicrotendipes sp.			
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae	4	8.00	0.08
Ephydridae			
Eukiefferiella sp.			
Euparyphus sp.			
Heleniella sp.	252	504.00	5.08
Hemerodromia sp.	4	8.00	0.08
Heterotrissocladius sp.			
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.			

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.	228	456.00	4.60
Odontomesa sp.	60	120.00	1.21
Orthocladiinae			
Orthocladius sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.	44	88.00	0.89
Paratanytarsus sp.			
Paratendipes sp.	12	24.00	0.24
Parochlus sp.			
Pericoma sp.	4	8.00	0.08
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.	228	456.00	4.60
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	40	80.00	0.81
Radotanypus submarginella	8	16.00	0.16
Simulium vittatum complex	12	24.00	0.24
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.	1108	2216.00	22.36
Thienemanniella sp.			
Thienemannimyia group	144	288.00	2.91
Tipula sp.			
Tipulidae			
Tvetenia sp.	8	16.00	0.16
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	48	96.00	0.97
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	92	184.00	1.86
Totals:	4956	9912.00	100.00

Total Density (N/m^2)	9912
Total Number of Taxa	38
Diversity (d)	3.85

Community Parameters	Kick Sample
Total Density (N/m^2)	9912
Diversity (d)	3.85
Total Number of Taxa	38
% Dominant Taxon	22.36
EPT Richness 3/0/3	6
EPT (abundance)	1048.00
Chiron (abundance)	4232.00
EPT/Chironomid ratio	0.25
Scraper (abundance)	128.00
Filterer (abundance)	2424.00
SC/F ratio	0.05
Shredder (abundance)	576.00
SH/Total ratio	0.06
HBI	6.70
ICI	28

Relative Abundance by Order	
TURBELLARIA	1.53
NEMATODA	1.69
OLIGOCHAETA	18.40
HIRUDINEA	0.00
AMPHIPODA	3.79
DECAPODA	0.00
ACARI	0.48
COLEMBOLA	0.00
EPHEMEROPTERA	9.04
ODONATA	0.65
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.53
COLEOPTERA	0.00
DIPTERA	60.05
GASTROPODA	0.97
BIVALVIA	1.86
Totals:	100.00

Density by Order	
TURBELLARIA	152
NEMATODA	168
OLIGOCHAETA	1824
HIRUDINEA	0
AMPHIPODA	376
DECAPODA	0
ACARI	48
COLEMBOLA	0
EPHEMEROPTERA	896
ODONATA	64
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	152
COLEOPTERA	0
DIPTERA	5952
GASTROPODA	96
BIVALVIA	184
Totals:	9912

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	48	133.22	0.56
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	8	22.20	0.09
Nais communis	8	22.20	0.09
Pristina aequiseta			
Slavina appendiculata	24	66.61	0.28
Tubificidae with hair chaetae	8	22.20	0.09
Tubificidae without hair chaetae	1800	4995.90	20.85
HIRUDINEA			
Erpobdellidae	8	22.20	0.09
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	176	488.49	2.04
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA	8	22.20	0.09
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus			
Caenis bajaensis	1616	4485.21	18.72
Callibaetis sp.	16	44.41	0.19
Centroptilum sp.			
Fallceon quilleri	136	377.47	1.58
Leptophlebia sp.	8	22.20	0.09
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum	40	111.02	0.46
Argia sp.	24	66.61	0.28
Coenagrionidae	208	577.30	2.41
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	8	22.20	0.09
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.	8	22.20	0.09
Limnephilus sp.	8	22.20	0.09
COLEOPTERA			
Agabus sp. larvae	8	22.20	0.09
Anacaena sp. adult			
Colymbetinae larvae	16	44.41	0.19
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	8	22.20	0.09
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.	32	88.82	0.37
Apedilum sp.			
Brillia sp.			
Caloparyphus sp.	8	22.20	0.09
Ceratopogonidae	408	1132.40	4.73
Chaetocladius sp.	80	222.04	0.93
Chironomus sp.			
Corynoneura sp.	104	288.65	1.20
Cricotopus sp.	952	2642.28	11.03
Cryptochironomus sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	24	66.61	0.28
Dixa sp.			
Dixella sp.			
Dixidae			
Empididae			
Ephydridae			
Eukiefferiella sp.	8	22.20	0.09
Euparyphus sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.	56	155.43	0.65
Hydrobaenus sp.			
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.	8	22.20	0.09

RC1M (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.	816	2264.81	9.45
Odontomesa sp.	368	1021.38	4.26
Orthocladiinae			
Orthocladius sp.	40	111.02	0.46
Pagastia sp.	8	22.20	0.09
Paramerina sp.	344	954.77	3.99
Parametriocnemus sp.			
Paraphaenocladius sp.			
Paratanytarsus sp.	16	44.41	0.19
Paratendipes sp.	56	155.43	0.65
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.	40	111.02	0.46
Procladius sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Simulium vittatum complex	24	66.61	0.28
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.	944	2620.07	10.94
Thienemanniella sp.			
Thienemannimyia group	16	44.41	0.19
Tipula sp.			
Tipulidae			
Tvetenia sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	40	111.02	0.46
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	48	133.22	0.56
Totals:	8632	23958.12	100.00

Total Density (N/m^2)	23958
Total Number of Taxa	45
Diversity (d)	3.66

Community Parameters	Kick Sample
Total Density (N/m^2)	23958
Diversity (d)	3.66
Total Number of Taxa	45
% Dominant Taxon	20.85
EPT Richness 4/0/3	7
EPT (abundance)	4995.90
Chiron (abundance)	10857.76
EPT/Chironomid ratio	0.46
Scraper (abundance)	111.02
Filterer (abundance)	2842.11
SC/F ratio	0.04
Shredder (abundance)	2797.70
SH/Total ratio	0.12
HBI	7.17
ICI	30

Relative Abundance by Order	
TURBELLARIA	0.56
NEMATODA	0.00
OLIGOCHAETA	21.41
HIRUDINEA	0.09
AMPHIPODA	2.04
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.09
EPHEMEROPTERA	20.57
ODONATA	3.15
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	0.28
COLEOPTERA	0.37
DIPTERA	50.42
GASTROPODA	0.46
BIVALVIA	0.56
Totals:	100.00

Density by Order	
TURBELLARIA	133
NEMATODA	0
OLIGOCHAETA	5129
HIRUDINEA	22
AMPHIPODA	488
DECAPODA	0
ACARI	0
COLEMBOLA	22
EPHEMEROPTERA	4929
ODONATA	755
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	67
COLEOPTERA	89
DIPTERA	12079
GASTROPODA	111
BIVALVIA	133
Totals:	23958

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	8	22.20	0.34
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti	44	122.12	1.88
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis	4	11.10	0.17
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	224	621.71	9.58
Tubificidae without hair chaetae	264	732.73	11.29
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata	1	2.78	0.04
Mooreobdella fervida	3	8.33	0.13
Mooreobdella microstoma	1	2.78	0.04
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	200	555.10	8.55
DECAPODA			
Orconectes sp.	1	2.78	0.04
ACARI			
Arrenurus sp.			
Hygrobates sp.	20	55.51	0.86
Lebertia sp.			
Sperchon sp.	4	11.10	0.17
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus	12	33.31	0.51
Caenis bajaensis	444	1232.32	18.99
Callibaetis sp.			
Centroptilum sp.			
Fallceon quilleri	112	310.86	4.79
Leptophlebia sp.	8	22.20	0.34
Tricorythodes minutus	8	22.20	0.34
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	20	55.51	0.86
Coenagrionidae	40	111.02	1.71
Enallagma sp.			
Ischnura sp.	12	33.31	0.51
PLECOPTERA			
Malenka sp.			
HEMIPTERA			
Microvelia cerifera	8	22.20	0.34
Notonecta undulata			
Sigara grossolineata	8	22.20	0.34

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.	120	333.06	5.13
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.	4	11.10	0.17
COLEOPTERA			
Agabus sp. larvae			
Anacaena sp. adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	4	11.10	0.17
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae			
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae	28	77.71	1.20
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.	4	11.10	0.17
Caloparyphus sp.	8	22.20	0.34
Ceratopogonidae	56	155.43	2.40
Chaetocladius sp.	24	66.61	1.03
Chironomus sp.			
Corynoneura sp.	20	55.51	0.86
Cricotopus sp.	64	177.63	2.74
Cryptochironomus sp.	24	66.61	1.03
Dasyhelea sp.	4	11.10	0.17
Diamesa sp.	12	33.31	0.51
Dicrotendipes sp.			
Dixa sp.			
Dixella sp.	20	55.51	0.86
Dixidae	4	11.10	0.17
Empididae			
Ephydridae			
Eukiefferiella sp.	16	44.41	0.68
Euparyphus sp.			
Heleniella sp.	4	11.10	0.17
Hemerodromia sp.	8	22.20	0.34
Heterotrissocladius sp.	16	44.41	0.68
Hydrobaenus sp.			
Lauterborniella sp.	28	77.71	1.20
Limnophora sp.			
Limnophyes sp.			

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.	48	133.22	2.05
Nanocladius sp.	4	11.10	0.17
Nilotanypus sp.	16	44.41	0.68
Odontomesa sp.	4	11.10	0.17
Orthocladiinae			
Orthocladius sp.	16	44.41	0.68
Pagastia sp.	4	11.10	0.17
Paramerina sp.			
Parametriocnemus sp.	20	55.51	0.86
Paraphaenocladius sp.			
Paratanytarsus sp.	32	88.82	1.37
Paratendipes sp.	52	144.33	2.22
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Procladius sp.	24	66.61	1.03
Psectrocladius sp.			
Pseudochironomus sp.	4	11.10	0.17
Pseudodiamesa sp.			
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.	4	11.10	0.17
Radotanypus submarginella	40	111.02	1.71
Simulium vittatum complex	64	177.63	2.74
Simulium sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.	4	11.10	0.17
Thienemannimyia group	56	155.43	2.40
Tipula sp.			
Tipulidae			
Tvetenia sp.	8	22.20	0.34
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	16	44.41	0.68
Stagnicola caperata			
BIVALVIA			
Pisidium sp.	8	22.20	0.34
Totals:	2338	6489.12	100.00

Total Density (N/m^2)	6489
Total Number of Taxa	61
Diversity (d)	4.55

Community Parameters	Kick Sample
Total Density (N/m^2)	6489
Diversity (d)	4.55
Total Number of Taxa	61
% Dominant Taxon	18.99
EPT Richness 5/0/2	7
EPT (abundance)	1965.05
Chiron (abundance)	1520.97
EPT/Chironomid ratio	1.29
Scraper (abundance)	122.12
Filterer (abundance)	532.90
SC/F ratio	0.23
Shredder (abundance)	199.84
SH/Total ratio	0.03
HBI	7.19
ICI	34

Relative Abundance by Order	
TURBELLARIA	0.34
NEMATODA	0.00
OLIGOCHAETA	22.93
HIRUDINEA	0.21
AMPHIPODA	8.55
DECAPODA	0.04
ACARI	1.03
COLEMBOLA	0.00
EPHEMEROPTERA	24.98
ODONATA	3.08
PLECOPTERA	0.00
HEMIPTERA	0.68
TRICHOPTERA	5.30
COLEOPTERA	1.37
DIPTERA	30.45
GASTROPODA	0.68
BIVALVIA	0.34
Totals:	100.00

Density by Order	
TURBELLARIA	22
NEMATODA	0
OLIGOCHAETA	1488
HIRUDINEA	14
AMPHIPODA	555
DECAPODA	3
ACARI	67
COLEMBOLA	0
EPHEMEROPTERA	1621
ODONATA	200
PLECOPTERA	0
HEMIPTERA	44
TRICHOPTERA	344
COLEOPTERA	89
DIPTERA	1976
GASTROPODA	44
BIVALVIA	22
Totals:	6489

Sample Date: 15 May 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
NEMATODA			
OLIGOCHAETA			
Aulodrilus pigueti	12	29.11	0.29
Dero (Dero) nivea	124	300.76	3.00
Enchytraeidae	12	29.11	0.29
Lumbricidae			
Nais communis	132	320.17	3.19
Pristina aequiseta	8	19.40	0.19
Slavina appendiculata			
Tubificidae with hair chaetae	36	87.32	0.87
Tubificidae without hair chaetae	12	29.11	0.29
HIRUDINEA			
Erpobdellidae			
Haemopis marmorata			
Mooreobdella fervida			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca			
DECAPODA			
Orconectes sp.			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis sp.			
Baetis tricaudatus	364	882.88	8.79
Caenis bajaensis			
Callibaetis sp.	8	19.40	0.19
Centroptilum sp.			
Fallceon quilleri	20	48.51	0.48
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
Enallagma sp.			
Ischnura sp.			
PLECOPTERA			
Malenka sp.	4	9.70	0.10
HEMIPTERA			
Microvelia cerifera			
Notonecta undulata			
Sigara grossolineata			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TRICHOPTERA			
Cheumatopsyche sp.			
Hesperophylax sp.			
Hydropsyche sp.			
Hydroptila sp.			
Lepidostoma sp.			
Limnephilus sp.	12	29.11	0.29
COLEOPTERA			
Agabus sp. larvae	20	48.51	0.48
Anacaena sp. adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Enochrus ochraceous adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	4	9.70	0.10
Helophorus lacustris adult			
Hydrobius fuscipes adult and larvae			
Hydroporinae larvae	12	29.11	0.29
Laccobius sp. adult			
Laccophilus maculosus decipiens adult			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Optioservus sp. adult and larvae			
Paracymus sp. adult and larvae			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Brillia sp.	36	87.32	0.87
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.	88	213.44	2.13
Cricotopus sp.	212	514.21	5.12
Cryptochironomus sp.	4	9.70	0.10
Dasyhelea sp.	4	9.70	0.10
Diamesa sp.			
Dicrotendipes sp.	4	9.70	0.10
Dixa sp.	4	9.70	0.10
Dixella sp.	4	9.70	0.10
Dixidae			
Empididae	4	9.70	0.10
Ephydridae			
Eukiefferiella sp.			
Euparyphus sp.			
Heleniella sp.	56	135.83	1.35
Hemerodromia sp.			
Heterotrissocladius sp.	2060	4996.53	49.76
Hydrobaenus sp.	4	9.70	0.10
Lauterborniella sp.			
Limnophora sp.			
Limnophyes sp.	8	19.40	0.19

RC3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Metriocnemus sp.			
Micropsectra sp.			
Nanocladius sp.			
Nilotanypus sp.			
Odontomesa sp.	148	358.97	3.57
Orthocladiinae			
Orthocladius sp.			
Pagastia sp.	12	29.11	0.29
Paramerina sp.	176	426.89	4.25
Parametriocnemus sp.	28	67.91	0.68
Paraphaenocladius sp.	12	29.11	0.29
Paratanytarsus sp.	8	19.40	0.19
Paratendipes sp.	4	9.70	0.10
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.	124	300.76	3.00
Pilaria sp.			
Polypedilum sp.	4	9.70	0.10
Procladius sp.	8	19.40	0.19
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.	4	9.70	0.10
Pseudolimnophila sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	20	48.51	0.48
Simulium vittatum complex	92	223.15	2.22
Simulium sp.	44	106.72	1.06
Stictochironomus sp.			
Tanytarsus sp.	168	407.48	4.06
Thienemanniella sp.			
Thienemannimyia group	20	48.51	0.48
Tipula sp.			
Tipulidae			
Tvetenia sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
Stagnicola caperata			
BIVALVIA			
Pisidium sp.			
Totals:	4140	10041.57	100.00

Total Density (N/m^2)	10042
Total Number of Taxa	44
Diversity (d)	3.13

Community Parameters	Kick Sample
Total Density (N/m^2)	10042
Diversity (d)	3.13
Total Number of Taxa	44
% Dominant Taxon	49.76
EPT Richness 3/1/1	5
EPT (abundance)	989.60
Chiron (abundance)	7790.71
EPT/Chironomid ratio	0.13
Scraper (abundance)	300.76
Filterer (abundance)	737.35
SC/F ratio	0.41
Shredder (abundance)	650.03
SH/Total ratio	0.06
HBI	5.19
ICI	28

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0.00
OLIGOCHAETA	8.12
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	9.47
ODONATA	0.00
PLECOPTERA	0.10
HEMIPTERA	0.00
TRICHOPTERA	0.29
COLEOPTERA	0.87
DIPTERA	81.16
GASTROPODA	0.00
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	815
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	951
ODONATA	0
PLECOPTERA	10
HEMIPTERA	0
TRICHOPTERA	29
COLEOPTERA	87
DIPTERA	8150
GASTROPODA	0
BIVALVIA	0
Totals:	10042

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	4	8.00	0.33
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	8	16.00	0.66
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	176	352.00	14.56
DECAPODA			
Orconectes sp.	1	2.00	0.08
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA	4	8.00	0.33
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.	8	16.00	0.66
Amphiagrion abbreviatum			
Archilestes grandis	12	24.00	0.99
Argia sp.	32	64.00	2.65
Coenagrionidae			
HEMIPTERA			
Gerridae larvae	8	16.00	0.66
Microvelia sp. adult and larvae			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult			
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus sp. adult			
Laccobius sp. adult	4	8.00	0.33
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae	12	24.00	0.99
Chaetocladius sp.			
Chironomus sp.	8	16.00	0.66
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.	8	16.00	0.66
Dasyhelea sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae	12	24.00	0.99
Ephydridae			
Larsia sp.			
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.	512	1024.00	42.35
Nemotelus sp.	4	8.00	0.33
Nilotanypus sp.	8	16.00	0.66
Paramerina sp.	12	24.00	0.99
Paratanytarsus sp.			
Paratendipes sp.	112	224.00	9.26
Pericoma sp.			
Phaenopsectra sp.	88	176.00	7.28
Polypedilum sp.	4	8.00	0.33
Procladius sp.			
Pseudosmittia sp.	12	24.00	0.99
Radotanypus submarginella	136	272.00	11.25
Simulium vittatum complex			
Tanypus sp.			
Tanytarsus sp.			
Thienemannimyia group			
Tipula sp.			
Tipulidae			
Tvetenia sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae	4	8.00	0.33
Physa sp.	12	24.00	0.99
BIVALVIA			
Pisidium sp.	8	16.00	0.66
Totals:	1209	2418.00	100.00

Total Density (N/m^2)	2418
Total Number of Taxa	26
Diversity (d)	2.92

Community Parameters	Kick Sample
Total Density (N/m^2)	2418
Diversity (d)	2.92
Total Number of Taxa	26
% Dominant Taxon	42.35
EPT Richness 0/0/0	0
EPT (abundance)	0.00
Chiron (abundance)	1800.00
EPT/Chironomid ratio	0.00
Scraper (abundance)	208.00
Filterer (abundance)	16.00
SC/F ratio	13.00
Shredder (abundance)	8.00
SH/Total ratio	0.00
HBI	7.26
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	0.99
HIRUDINEA	0.00
AMPHIPODA	14.56
DECAPODA	0.08
ACARI	0.00
COLEMBOLA	0.33
EPHEMEROPTERA	0.00
ODONATA	4.30
PLECOPTERA	0
HEMIPTERA	0.66
TRICHOPTERA	0.00
COLEOPTERA	0.33
DIPTERA	76.76
GASTROPODA	1.32
BIVALVIA	0.66
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	24
HIRUDINEA	0
AMPHIPODA	352
DECAPODA	2
ACARI	0
COLEMBOLA	8
EPHEMEROPTERA	0
ODONATA	104
PLECOPTERA	0
HEMIPTERA	16
TRICHOPTERA	0
COLEOPTERA	8
DIPTERA	1856
GASTROPODA	32
BIVALVIA	16
Totals:	2418

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	16	44.41	0.23
Nais bretscheri/pardalis			
Nais communis			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	160	444.08	2.31
HIRUDINEA			
Erpobdellidae	64	177.63	0.92
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	2816	7815.81	40.64
DECAPODA			
Orconectes sp.			
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	352	976.98	5.08
Fallceon quilleri			
ODONATA			
Aeshna sp.	1	2.78	0.01
Amphiagrion abbreviatum			
Archilestes grandis	16	44.41	0.23
Argia sp.			
Coenagrionidae	32	88.82	0.46
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult			
Berosus peregrinus adult	16	44.41	0.23
Colymbetinae larvae	16	44.41	0.23
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.	16	44.41	0.23
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae			
Chaetocladius sp.	16	44.41	0.23
Chironomus sp.	16	44.41	0.23
Corynoneura sp.	112	310.86	1.62
Cricotopus sp.	304	843.75	4.39
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.	528	1465.46	7.62
Dixella sp.	64	177.63	0.92
Empididae			
Ephydridae			
Larsia sp.			
Limnophora sp.	16	44.41	0.23
Limnophyes sp.	32	88.82	0.46
Micropsectra sp.	528	1465.46	7.62
Nemotelus sp.			
Nilotanypus sp.	16	44.41	0.23
Paramerina sp.	64	177.63	0.92
Paratanytarsus sp.	528	1465.46	7.62
Paratendipes sp.	272	754.94	3.93
Pericoma sp.			
Phaenopsectra sp.	48	133.22	0.69
Polypedilum sp.			
Procladius sp.			
Pseudosmittia sp.			
Radotanypus submarginella			
Simulium vittatum complex	64	177.63	0.92
Tanypus sp.			
Tanytarsus sp.			
Thienemannimyia group	32	88.82	0.46
Tipula sp.			
Tipulidae			
Tvetenia sp.			

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae	80	222.04	1.15
Physa sp.	672	1865.14	9.70
BIVALVIA			
Pisidium sp.	32	88.82	0.46
Totals:	6929	19231.44	100.00

Total Density (N/m^2)	19231
Total Number of Taxa	30
Diversity (d)	3.23

Community Parameters	Kick Sample
Total Density (N/m^2)	19231
Diversity (d)	3.23
Total Number of Taxa	30
% Dominant Taxon	40.64
EPT Richness 1/0/0	1
EPT (abundance)	976.98
Chiron (abundance)	6972.06
EPT/Chironomid ratio	0.14
Scraper (abundance)	2220.40
Filterer (abundance)	266.45
SC/F ratio	8.33
Shredder (abundance)	843.75
SH/Total ratio	0.04
HBI	7.65
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	2.54
HIRUDINEA	0.92
AMPHIPODA	40.64
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	5.08
ODONATA	0.71
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	0.00
COLEOPTERA	0.46
DIPTERA	38.33
GASTROPODA	10.85
BIVALVIA	0.46
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	488
HIRUDINEA	178
AMPHIPODA	7816
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	977
ODONATA	136
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	0
COLEOPTERA	89
DIPTERA	7372
GASTROPODA	2087
BIVALVIA	89
Totals:	19231

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea	8	16.84	0.21
Enchytraeidae			
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	8	16.84	0.21
HIRUDINEA			
Erpobdellidae	32	67.38	0.82
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	1768	3722.52	45.43
DECAPODA			
Orconectes sp.	4	8.42	0.10
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.	8	16.84	0.21
COLLEMBOLA	8	16.84	0.21
EPHEMEROPTERA			
Baetis flavistriga	16	33.69	0.41
Baetis magnus	120	252.66	3.08
Baetis notos	32	67.38	0.82
Baetis tricaudatus	1128	2375.00	28.98
Caenis bajaensis	8	16.84	0.21
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Archilestes grandis	8	16.84	0.21
Argia sp.	8	16.84	0.21
Coenagrionidae			
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae	8	16.84	0.21
TRICHOPTERA			
Cheumatopsyche sp.	496	1044.33	12.74
Hydropsyche sp.	144	303.19	3.70
Lepidostoma sp.			
Limnephilidae			

WC3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult			
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult	8	16.84	0.21
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae	8	16.84	0.21
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.	8	16.84	0.21
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Larsia sp.			
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.			
Paramerina sp.			
Paratanytarsus sp.			
Paratendipes sp.			
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudosmittia sp.			
Radotanypus submarginella			
Simulium vittatum complex	32	67.38	0.82
Tanypus sp.			
Tanytarsus sp.			
Thienemannimyia group	8	16.84	0.21
Tipula sp.			
Tipulidae			
Tvetenia sp.	16	33.69	0.41

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	8	16.84	0.21
BIVALVIA			
Pisidium sp.			
Totals:	3892	8194.61	100.00

Total Density (N/m^2)	8195
Total Number of Taxa	24
Diversity (d)	2.23

Community Parameters	Kick Sample
Total Density (N/m^2)	8195
Diversity (d)	2.23
Total Number of Taxa	24
% Dominant Taxon	45.43
EPT Richness 5/0/2	7
EPT (abundance)	4093.09
Chiron (abundance)	67.38
EPT/Chironomid ratio	60.75
Scraper (abundance)	16.84
Filterer (abundance)	1414.90
SC/F ratio	0.01
Shredder (abundance)	16.84
SH/Total ratio	0.00
HBI	6.42
ICI	26

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	0.41
HIRUDINEA	0.82
AMPHIPODA	45.43
DECAPODA	0.10
ACARI	0.21
COLEMBOLA	0.21
EPHEMEROPTERA	33.50
ODONATA	0.41
PLECOPTERA	0
HEMIPTERA	0.21
TRICHOPTERA	16.44
COLEOPTERA	0.21
DIPTERA	1.85
GASTROPODA	0.21
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	34
HIRUDINEA	67
AMPHIPODA	3723
DECAPODA	8
ACARI	17
COLEMBOLA	17
EPHEMEROPTERA	2746
ODONATA	34
PLECOPTERA	0
HEMIPTERA	17
TRICHOPTERA	1348
COLEOPTERA	17
DIPTERA	152
GASTROPODA	17
BIVALVIA	0
Totals:	8195

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea	16	32.00	0.67
Enchytraeidae			
Lumbricidae			
Nais bretscheri/pardalis	8	16.00	0.34
Nais communis	72	144.00	3.02
Slavina appendiculata			
Tubificidae with hair chaetae	24	48.00	1.01
Tubificidae without hair chaetae	1872	3744.00	78.52
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis	16	32.00	0.67
Mooreobdella microstoma	32	64.00	1.34
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	56	112.00	2.35
DECAPODA			
Orconectes sp.			
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	40	80.00	1.68
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.	8	16.00	0.34
Amphiagrion abbreviatum			
Archilestes grandis			
Argia sp.			
Coenagrionidae	40	80.00	1.68
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae			
TRICHOPTERA			
Cheumatopsyche sp.	24	48.00	1.01
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult			
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae	16	32.00	0.67
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Larsia sp.			
Limnophora sp.			
Limnophyes sp.	8	16.00	0.34
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.			
Paramerina sp.			
Paratanytarsus sp.			
Paratendipes sp.	48	96.00	2.01
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.	8	16.00	0.34
Pseudosmittia sp.			
Radotanypus submarginella			
Simulium vittatum complex			
Tanypus sp.			
Tanytarsus sp.	8	16.00	0.34
Thienemannimyia group			
Tipula sp.	8	16.00	0.34
Tipulidae			
Tvetenia sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	48	96.00	2.01
BIVALVIA			
Pisidium sp.	32	64.00	1.34
Totals:	2384	4768.00	100.00

Total Density (N/m^2)	4768
Total Number of Taxa	20
Diversity (d)	1.59

Community Parameters	Kick Sample
Total Density (N/m^2)	4768
Diversity (d)	1.59
Total Number of Taxa	20
% Dominant Taxon	78.52
EPT Richness 1/0/1	2
EPT (abundance)	128.00
Chiron (abundance)	144.00
EPT/Chironomid ratio	0.89
Scraper (abundance)	96.00
Filterer (abundance)	128.00
SC/F ratio	0.75
Shredder (abundance)	16.00
SH/Total ratio	0.00
HBI	9.53
ICI	10

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	83.56
HIRUDINEA	2.01
AMPHIPODA	2.35
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	1.68
ODONATA	2.01
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	1.01
COLEOPTERA	0.00
DIPTERA	4.03
GASTROPODA	2.01
BIVALVIA	1.34
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	3984
HIRUDINEA	96
AMPHIPODA	112
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	80
ODONATA	96
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	48
COLEOPTERA	0
DIPTERA	192
GASTROPODA	96
BIVALVIA	64
Totals:	4768

WO2

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti	448	896.00	35.39
Dero (Dero) nivea	8	16.00	0.63
Enchytraeidae			
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis	16	32.00	1.26
Slavina appendiculata			
Tubificidae with hair chaetae	32	64.00	2.53
Tubificidae without hair chaetae	20	40.00	1.58
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.	8	16.00	0.63
Hyalella azteca	424	848.00	33.49
DECAPODA			
Orconectes sp.			
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.	2	4.00	0.16
Amphiagrion abbreviatum			
Archilestes grandis			
Argia sp.			
Coenagrionidae	4	8.00	0.32
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult			
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae	4	8.00	0.32
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	8	16.00	0.63
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.	4	8.00	0.32
Bittacomorpha sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	88	176.00	6.95
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.	40	80.00	3.16
Dixella sp.			
Empididae			
Ephydridae			
Larsia sp.			
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.			
Paramerina sp.			
Paratanytarsus sp.	20	40.00	1.58
Paratendipes sp.			
Pericoma sp.			
Phaenopsectra sp.	24	48.00	1.90
Polypedilum sp.			
Procladius sp.	4	8.00	0.32
Pseudosmittia sp.			
Radotanypus submarginella	20	40.00	1.58
Simulium vittatum complex			
Tanypus sp.	4	8.00	0.32
Tanytarsus sp.	44	88.00	3.48
Thienemannimyia group			
Tipula sp.			
Tipulidae			
Tvetenia sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.	4	8.00	0.32
Lymnaeidae			
Physa sp.			
BIVALVIA			
Pisidium sp.	40	80.00	3.16
Totals:	1266	2532.00	100.00

Total Density (N/m^2)	2532
Total Number of Taxa	22
Diversity (d)	2.73

Community Parameters	Kick Sample
Total Density (N/m^2)	2532
Diversity (d)	2.73
Total Number of Taxa	22
% Dominant Taxon	35.39
EPT Richness 0/0/0	0
EPT (abundance)	0.00
Chiron (abundance)	496.00
EPT/Chironomid ratio	0.00
Scraper (abundance)	56.00
Filterer (abundance)	168.00
SC/F ratio	0.33
Shredder (abundance)	0.00
SH/Total ratio	0.00
HBI	6.91
ICI	6

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	41.39
HIRUDINEA	0.00
AMPHIPODA	34.12
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	0.47
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	0.00
COLEOPTERA	0.95
DIPTERA	19.59
GASTROPODA	0.32
BIVALVIA	3.16
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1048
HIRUDINEA	0
AMPHIPODA	864
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	12
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	0
COLEOPTERA	24
DIPTERA	496
GASTROPODA	8
BIVALVIA	80
Totals:	2532

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	24	48.00	1.99
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae	8	16.00	0.66
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis	8	16.00	0.66
Slavina appendiculata			
Tubificidae with hair chaetae	4	8.00	0.33
Tubificidae without hair chaetae	20	40.00	1.66
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	460	920.00	38.21
DECAPODA			
Orconectes sp.			
ACARI (undetermined)	16	32.00	1.33
Arrenurus sp.	16	32.00	1.33
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus	4	8.00	0.33
Caenis bajaensis	8	16.00	0.66
Callibaetis sp.			
Fallceon quilleri	56	112.00	4.65
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Archilestes grandis			
Argia sp.	32	64.00	2.66
Coenagrionidae			
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae	12	24.00	1.00
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.	20	40.00	1.66
Limnephilidae	40	80.00	3.32

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult	4	8.00	0.33
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult	4	8.00	0.33
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.	32	64.00	2.66
Ceratopogonidae	4	8.00	0.33
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.	4	8.00	0.33
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae	20	40.00	1.66
Larsia sp.	8	16.00	0.66
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.	68	136.00	5.65
Paramerina sp.			
Paratanytarsus sp.			
Paratendipes sp.	4	8.00	0.33
Pericoma sp.	4	8.00	0.33
Phaenopsectra sp.			
Polypedilum sp.	4	8.00	0.33
Procladius sp.			
Pseudosmittia sp.	8	16.00	0.66
Radotanypus submarginella	20	40.00	1.66
Simulium vittatum complex			
Tanypus sp.			
Tanytarsus sp.	16	32.00	1.33
Thienemannimyia group	16	32.00	1.33
Tipula sp.			
Tipulidae	4	8.00	0.33
Tvetenia sp.			

RC1 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	24	48.00	1.99
BIVALVIA			
Pisidium sp.	232	464.00	19.27
Totals:	1204	2408.00	100.00

Total Density (N/m^2)	2408
Total Number of Taxa	33
Diversity (d)	3.40

RC1

Community Parameters	Kick Sample
Total Density (N/m^2)	2408
Diversity (d)	3.40
Total Number of Taxa	33
% Dominant Taxon	38.21
EPT Richness 3/0/2	5
EPT (abundance)	256.00
Chiron (abundance)	288.00
EPT/Chironomid ratio	0.89
Scraper (abundance)	48.00
Filterer (abundance)	496.00
SC/F ratio	0.10
Shredder (abundance)	136.00
SH/Total ratio	0.06
HBI	7.14
ICI	24

Relative Abundance by Order	
TURBELLARIA	1.99
NEMATODA	0
OLIGOCHAETA	3.32
HIRUDINEA	0.00
AMPHIPODA	38.21
DECAPODA	0.00
ACARI	2.66
COLEMBOLA	0.00
EPHEMEROPTERA	5.65
ODONATA	2.66
PLECOPTERA	0
HEMIPTERA	1.00
TRICHOPTERA	4.98
COLEOPTERA	0.66
DIPTERA	17.61
GASTROPODA	1.99
BIVALVIA	19.27
Totals:	100.00

Density by Order	
TURBELLARIA	48
NEMATODA	0
OLIGOCHAETA	80
HIRUDINEA	0
AMPHIPODA	920
DECAPODA	0
ACARI	64
COLEMBOLA	0
EPHEMEROPTERA	136
ODONATA	64
PLECOPTERA	0
HEMIPTERA	24
TRICHOPTERA	120
COLEOPTERA	16
DIPTERA	424
GASTROPODA	48
BIVALVIA	464
Totals:	2408

RC1M

Sample Date: 26 July 2002

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	1032	2156.88	22.20
OLIGOCHAETA			
Aulodrilus pigueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis			
Slavina appendiculata	64	133.76	1.38
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	480	1003.20	10.33
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	2432	5082.88	52.32
DECAPODA			
Orconectes sp.			
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum	216	451.44	4.65
Archilestes grandis			
Argia sp.			
Coenagrionidae	24	50.16	0.52
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

RC1M (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult	24	50.16	0.52
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	8	16.72	0.17
Helophorus sp. adult			
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. adult			
Paracymus sp. adult			
Peltodytes sp. larvae	32	66.88	0.69
Tropisternus sp. larvae	32	66.88	0.69
DIPTERA			
Acricotopus sp.	8	16.72	0.17
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	16	33.44	0.34
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Larsia sp.	16	33.44	0.34
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.	80	167.20	1.72
Paramerina sp.	16	33.44	0.34
Paratanytarsus sp.			
Paratendipes sp.	24	50.16	0.52
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudosmittia sp.			
Radotanypus submarginella	8	16.72	0.17
Simulium vittatum complex			
Tanypus sp.			
Tanytarsus sp.			
Thienemannimyia group			
Tipula sp.			
Tipulidae			
Tvetenia sp.			

RC1M (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	80	167.20	1.72
BIVALVIA			
Pisidium sp.	56	117.04	1.20
Totals:	4648	9714.32	100.00

Total Density (N/m^2)	9714
Total Number of Taxa	19
Diversity (d)	2.23

Community Parameters	Kick Sample
Total Density (N/m^2)	9714
Diversity (d)	2.23
Total Number of Taxa	19
% Dominant Taxon	52.32
EPT Richness 0/0/0	0
EPT (abundance)	0.00
Chiron (abundance)	351.12
EPT/Chironomid ratio	0.00
Scraper (abundance)	234.08
Filterer (abundance)	117.04
SC/F ratio	2.00
Shredder (abundance)	0.00
SH/Total ratio	0.00
HBI	7.08
ICI	2

Relative Abundance by Order	
TURBELLARIA	22.20
NEMATODA	0
OLIGOCHAETA	11.70
HIRUDINEA	0.00
AMPHIPODA	52.32
DECAPODA	0.00
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	5.16
PLECOPTERA	0
HEMIPTERA	0.00
TRICHOPTERA	0.00
COLEOPTERA	2.07
DIPTERA	3.61
GASTROPODA	1.72
BIVALVIA	1.20
Totals:	100.00

Density by Order	
TURBELLARIA	2157
NEMATODA	0
OLIGOCHAETA	1137
HIRUDINEA	0
AMPHIPODA	5083
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	502
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	0
COLEOPTERA	201
DIPTERA	351
GASTROPODA	167
BIVALVIA	117
Totals:	9714

RC2

Sample Date: 26 July 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus pigueti	64	203.20	2.42
Dero (Dero) nivea	72	228.60	2.73
Enchytraeidae			
Lumbricidae			
Nais bretscheri/pardalis			
Nais communis			
Slavina appendiculata			
Tubificidae with hair chaetae	528	1676.40	19.98
Tubificidae without hair chaetae	1624	5156.20	61.47
HIRUDINEA			
Erpobdellidae	24	76.20	0.91
Helobdella stagnalis			
Mooreobdella microstoma			
AMPHIPODA			
Crangonyx sp.			
Hyalella azteca	176	558.80	6.66
DECAPODA			
Orconectes sp.	1	3.18	0.04
ACARI (undetermined)			
Arrenurus sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis flavistriga			
Baetis magnus			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	8	25.40	0.30
Callibaetis sp.			
Fallceon quilleri			
ODONATA			
Aeshna sp.	1	3.18	0.04
Amphiagrion abbreviatum			
Archilestes grandis			
Argia sp.			
Coenagrionidae			
HEMIPTERA			
Gerridae larvae			
Microvelia sp. adult and larvae	8	25.40	0.30
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Lepidostoma sp.			
Limnephilidae			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Anacaena sp. adult	40	127.00	1.51
Berosus peregrinus adult			
Colymbetinae larvae			
Cymbiodyta sp. adult			
Dubiraphia sp. larvae			
Gymnochthebius falli adult	8	25.40	0.30
Haliplus immaculicollis adult	8	25.40	0.30
Haliplus sp. larvae			
Helophorus sp. adult	8	25.40	0.30
Laccobius sp. adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult	24	76.20	0.91
Optioservus sp. adult	8	25.40	0.30
Paracymus sp. adult	16	50.80	0.61
Peltodytes sp. larvae			
Tropisternus sp. larvae			
DIPTERA			
Acricotopus sp.			
Alotanypus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Dasyhelea sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Larsia sp.			
Limnophora sp.			
Limnophyes sp.			
Micropsectra sp.			
Nemotelus sp.			
Nilotanypus sp.			
Paramerina sp.			
Paratanytarsus sp.	8	25.40	0.30
Paratendipes sp.			
Pericoma sp.			
Phaenopsectra sp.			
Polypedilum sp.			
Procladius sp.			
Pseudosmittia sp.			
Radotanypus submarginella			
Simulium vittatum complex			
Tanypus sp.			
Tanytarsus sp.			
Thienemannimyia group			
Tipula sp.			
Tipulidae			
Tvetenia sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
GASTROPODA			
Gyraulus sp.			
Lymnaeidae	8	25.40	0.30
Physa sp.	8	25.40	0.30
BIVALVIA			
Pisidium sp.			
Totals:	2642	8388.35	100.00

Total Density (N/m^2)	8388
Total Number of Taxa	20
Diversity (d)	1.92

Community Parameters	Kick Sample
Total Density (N/m^2)	8388
Diversity (d)	1.92
Total Number of Taxa	20
% Dominant Taxon	61.47
EPT Richness 1/0/0	1
EPT (abundance)	25.40
Chiron (abundance)	25.40
EPT/Chironomid ratio	1.00
Scraper (abundance)	76.20
Filterer (abundance)	0.00
SC/F ratio	n/a
Shredder (abundance)	25.40
SH/Total ratio	0.00
HBI	9.47
ICI	6

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	86.60
HIRUDINEA	0.91
AMPHIPODA	6.66
DECAPODA	0.04
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.30
ODONATA	0.04
PLECOPTERA	0
HEMIPTERA	0.30
TRICHOPTERA	0.00
COLEOPTERA	4.24
DIPTERA	0.30
GASTROPODA	0.61
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	7264
HIRUDINEA	76
AMPHIPODA	559
DECAPODA	3
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	25
ODONATA	3
PLECOPTERA	0
HEMIPTERA	25
TRICHOPTERA	0
COLEOPTERA	356
DIPTERA	25
GASTROPODA	51
BIVALVIA	0
Totals:	8388

WC1

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	8	8.00	0.21
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea	96	96.00	2.54
Enchytraeidae	24	24.00	0.63
Lumbricidae			
Nais communis	224	224.00	5.92
Nais variabilis	96	96.00	2.54
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	16	16.00	0.42
Tubificidae without hair chaetae	1208	1208.00	31.92
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	272	272.00	7.19
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus	8	8.00	0.21
Caenis bajaensis	112	112.00	2.96
Callibaetis sp.	56	56.00	1.48
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	80	80.00	2.11
Coenagrionidae	16	16.00	0.42
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	72	72.00	1.90

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	16	16.00	0.42
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae	8	8.00	0.21
Hydraena sp. adult			
Hydroporinae larvae	16	16.00	0.42
Liodessus abjectus adult			
Neoporus dimidiatus adult	8	8.00	0.21
Ochthebius sp. adult			
Optioservus sp. larvae	8	8.00	0.21
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.	16	16.00	0.42
Caloparyphus sp.			
Ceratopogonidae	192	192.00	5.07
Chaetocladius sp.			
Chironomus sp.	8	8.00	0.21
Corynoneura sp.	16	16.00	0.42
Cricotopus sp.			
Cryptochironomus sp.	24	24.00	0.63
Culicidae			
Culiseta sp.			
Dasyhelea sp.	8	8.00	0.21
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.	8	8.00	0.21
Hydrobaenus sp.	16	16.00	0.42
Limnophora sp.			
Limnophyes sp.	8	8.00	0.21
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.	48	48.00	1.27
Pagastia sp.			
Paramerina sp.	48	48.00	1.27
Parametriocnemus sp.			
Paraphaenocladius sp.	8	8.00	0.21

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.	8	8.00	0.21
Paratendipes sp.	144	144.00	3.81
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.	8	8.00	0.21
Pilaria sp.			
Polypedilum sp.	24	24.00	0.63
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	152	152.00	4.02
Rheocricotopus sp.			
Simulium vittatum complex	48	48.00	1.27
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.	144	144.00	3.81
Thienemanniella sp.			
Thienemannimyia group	8	8.00	0.21
Tipula sp.	8	8.00	0.21
GASTROPODA			
Fossaria obrussa	56	56.00	1.48
Gyraulus sp.			
Lymnaeidae			
Physa sp.	360	360.00	9.51
BIVALVIA			
Pisidium sp.	80	80.00	2.11
Totals:	3784	3784.00	100.00

Total Density (N/m^2)	3784
Total Number of Taxa	43
Diversity (d)	3.94

WC1

Community Parameters	Kick Sample
Total Density (N/m^2)	3784
Diversity (d)	3.94
Total Number of Taxa	43
% Dominant Taxon	31.92
EPT Richness 3/0/1	4
EPT (abundance)	248.00
Chiron (abundance)	688.00
EPT/Chironomid ratio	0.36
Scraper (abundance)	432.00
Filterer (abundance)	272.00
SC/F ratio	1.59
Shredder (abundance)	120.00
SH/Total ratio	0.03
HBI	8.31
ICI	22

Relative Abundance by Order	
TURBELLARIA	0.21
NEMATODA	0
OLIGOCHAETA	43.97
HIRUDINEA	0.00
AMPHIPODA	7.19
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	4.65
ODONATA	2.54
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.90
COLEOPTERA	1.48
DIPTERA	24.95
GASTROPODA	10.99
BIVALVIA	2.11
Totals:	100.00

Density by Order	
TURBELLARIA	8
NEMATODA	0
OLIGOCHAETA	1664
HIRUDINEA	0
AMPHIPODA	272
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	176
ODONATA	96
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	72
COLEOPTERA	56
DIPTERA	944
GASTROPODA	416
BIVALVIA	80
Totals:	3784

WC2

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae	4	11.10	0.21
Nais communis	8	22.20	0.43
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	16	44.41	0.85
Tubificidae without hair chaetae	16	44.41	0.85
HIRUDINEA			
Erpobdellidae	4	11.10	0.21
Helobdella stagnalis	8	22.20	0.43
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	420	1165.71	22.34
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	36	99.92	1.91
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	48	133.22	2.55
Coenagrionidae	28	77.71	1.49
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis	8	22.20	0.43
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis	4	11.10	0.21
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	12	33.31	0.64

WC2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	16	44.41	0.85
Anacaena sp. adult	4	11.10	0.21
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae	4	11.10	0.21
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult	4	11.10	0.21
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult	12	33.31	0.64
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.	8	22.20	0.43
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.	8	22.20	0.43
Corynoneura sp.	4	11.10	0.21
Cricotopus sp.	4	11.10	0.21
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	16	44.41	0.85
Dixella sp.			
Empididae	4	11.10	0.21
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.	16	44.41	0.85
Limonia sp.			
Metriocnemus sp.	12	33.31	0.64
Micropsectra sp.	40	111.02	2.13
Pagastia sp.			
Paramerina sp.	16	44.41	0.85
Parametriocnemus sp.			
Paraphaenocladius sp.	4	11.10	0.21

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.	8	22.20	0.43
Paratendipes sp.	52	144.33	2.77
Parochlus sp.			
Pericoma sp.	8	22.20	0.43
Phaenopsectra sp.	8	22.20	0.43
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	4	11.10	0.21
Rheocricotopus sp.			
Simulium vittatum complex	32	88.82	1.70
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.	12	33.31	0.64
Thienemanniella sp.			
Thienemannimyia group	20	55.51	1.06
Tipula sp.	8	22.20	0.43
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	860	2386.93	45.74
BIVALVIA			
Pisidium sp.	84	233.14	4.47
Totals:	1880	5217.94	100.00

Total Density (N/m^2)	5218
Total Number of Taxa	40
Diversity (d)	3.01

Community Parameters	Kick Sample
Total Density (N/m^2)	5218
Diversity (d)	3.01
Total Number of Taxa	40
% Dominant Taxon	45.74
EPT Richness 1/0/1	2
EPT (abundance)	133.22
Chiron (abundance)	643.92
EPT/Chironomid ratio	0.21
Scraper (abundance)	2409.13
Filterer (abundance)	355.26
SC/F ratio	6.78
Shredder (abundance)	88.82
SH/Total ratio	0.02
HBI	7.76
ICI	18

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	2.34
HIRUDINEA	0.64
AMPHIPODA	22.34
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	1.91
ODONATA	4.04
PLECOPTERA	0.00
HEMIPTERA	0.64
TRICHOPTERA	0.64
COLEOPTERA	2.13
DIPTERA	15.11
GASTROPODA	45.74
BIVALVIA	4.47
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	122
HIRUDINEA	33
AMPHIPODA	1166
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	100
ODONATA	211
PLECOPTERA	0
HEMIPTERA	33
TRICHOPTERA	33
COLEOPTERA	111
DIPTERA	788
GASTROPODA	2387
BIVALVIA	233
Totals:	5218

WC3

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea	4	8.42	0.13
Enchytraeidae			
Lumbricidae			
Nais communis	28	58.95	0.89
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	4	8.42	0.13
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	572	1204.35	18.13
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.	28	58.95	0.89
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos	20	42.11	0.63
Baetis tricaudatus	664	1398.05	21.05
Caenis bajaensis			
Callibaetis sp.	36	75.80	1.14
Fallceon quilleri	8	16.84	0.25
Leptophlebia sp.			
Tricorythodes minutus	12	25.27	0.38
ODONATA			
Aeshna sp.	3	6.32	0.10
Amphiagrion abbreviatum			
Argia sp.	12	25.27	0.38
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.	224	471.63	7.10
Hydropsyche sp.	56	117.91	1.77
Hydroptila sp.			
Limnephilidae	20	42.11	0.63
Limnephilus sp.			

WC3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	4	8.42	0.13
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult	4	8.42	0.13
Optioservus sp. larvae			
Peltodytes edentulus adult	4	8.42	0.13
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.	12	25.27	0.38
Caloparyphus sp.	4	8.42	0.13
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.	8	16.84	0.25
Cricotopus sp.	36	75.80	1.14
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.	288	606.38	9.13
Heleniella sp.			
Hemerodromia sp.	8	16.84	0.25
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.	4	8.42	0.13
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.			
Pagastia sp.	12	25.27	0.38
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

WC3

Community Parameters	Kick Sample
Total Density (N/m^2)	6643
Diversity (d)	2.90
Total Number of Taxa	32
% Dominant Taxon	32.71
EPT Richness 5/0/3	8
EPT (abundance)	2189.72
Chiron (abundance)	842.20
EPT/Chironomid ratio	2.60
Scraper (abundance)	8.42
Filterer (abundance)	2812.95
SC/F ratio	0.00
Shredder (abundance)	143.17
SH/Total ratio	0.02
HBI	6.28
ICI	32

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	1.14
HIRUDINEA	0.00
AMPHIPODA	18.13
DECAPODA	0
ACARI	0.89
COLEMBOLA	0.00
EPHEMEROPTERA	23.45
ODONATA	0.48
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	9.51
COLEOPTERA	0.38
DIPTERA	45.90
GASTROPODA	0.00
BIVALVIA	0.13
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	76
HIRUDINEA	0
AMPHIPODA	1204
DECAPODA	0
ACARI	59
COLEMBOLA	0
EPHEMEROPTERA	1558
ODONATA	32
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	632
COLEOPTERA	25
DIPTERA	3049
GASTROPODA	0
BIVALVIA	8
Totals:	6643

WC4

Sample Date: 12 November 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	24	24.00	1.45
Lumbricidae			
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis	1628	1628.00	98.31
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae	4	4.00	0.24
Limnephilus sp.			

WC4 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

WC4 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex			
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
BIVALVIA			
Pisidium sp.			
Totals:	1656	1656.00	100.00

Total Density (N/m^2)	1656
Total Number of Taxa	3
Diversity (d)	0.13

Community Parameters	Kick Sample
Total Density (N/m^2)	1656
Diversity (d)	0.13
Total Number of Taxa	3
% Dominant Taxon	98.31
EPT Richness 0/0/1	1
EPT (abundance)	4.00
Chiron (abundance)	0.00
EPT/Chironomid ratio	n/a
Scraper (abundance)	0.00
Filterer (abundance)	0.00
SC/F ratio	0.00
Shredder (abundance)	4.00
SH/Total ratio	0.00
HBI	5.07
ICI	16

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	1.45
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	98.31
TRICHOPTERA	0.24
COLEOPTERA	0.00
DIPTERA	0.00
GASTROPODA	0.00
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	24
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	0
PLECOPTERA	0
HEMIPTERA	1628
TRICHOPTERA	4
COLEOPTERA	0
DIPTERA	0
GASTROPODA	0
BIVALVIA	0
Totals:	1656

WC5

Sample Date: 12 November 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	32	32.00	0.17
Lumbricidae	32	32.00	0.17
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	1264	1264.00	6.74
Tubificidae without hair chaetae	64	64.00	0.34
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	16	16.00	0.09
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta	16	16.00	0.09
Corisella tarsalis	32	32.00	0.17
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi	16	16.00	0.09
Notonecta undulata			
Trichocorixa borealis	17264	17264.00	92.06
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.			

WC5 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex			
Simulium sp.			
Smittia sp.	16	16.00	0.09
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
BIVALVIA			
Pisidium sp.			
Totals:	18752	18752.00	100.00

Total Density (N/m^2)	18752
Total Number of Taxa	10
Diversity (d)	0.48

WC5

Community Parameters	Kick Sample
Total Density (N/m^2)	18752
Diversity (d)	0.48
Total Number of Taxa	10
% Dominant Taxon	92.06
EPT Richness 1/0/0	1
EPT (abundance)	16.00
Chiron (abundance)	16.00
EPT/Chironomid ratio	1.00
Scraper (abundance)	0.00
Filterer (abundance)	0.00
SC/F ratio	0.00
Shredder (abundance)	0.00
SH/Total ratio	0.00
HBI	5.39
ICI	14

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	7.42
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.09
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	92.41
TRICHOPTERA	0.00
COLEOPTERA	0.00
DIPTERA	0.09
GASTROPODA	0.00
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	1392
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	16
ODONATA	0
PLECOPTERA	0
HEMIPTERA	17328
TRICHOPTERA	0
COLEOPTERA	0
DIPTERA	16
GASTROPODA	0
BIVALVIA	0
Totals:	18752

Sample Date: 25 October 2002

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	24	58.21	1.37
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	16	38.81	0.91
Lumbricidae	8	19.40	0.46
Nais communis	432	1047.82	24.60
Nais variabilis	72	174.64	4.10
Pristina aequiseta	4	9.70	0.23
Slavina appendiculata			
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	332	805.27	18.91
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	4	9.70	0.23
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	4	9.70	0.23
Callibaetis sp.			
Fallceon quilleri	16	38.81	0.91
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.	20	48.51	1.14
Coenagrionidae			
PLECOPTERA			
Capnura wanica	8	19.40	0.46
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	32	77.62	1.82
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae	40	97.02	2.28
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae	4	9.70	0.23
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	112	271.66	6.38
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.	56	135.83	3.19
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.	4	9.70	0.23
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.	256	620.93	14.58
Pagastia sp.			
Paramerina sp.	4	9.70	0.23
Parametriocnemus sp.	4	9.70	0.23
Paraphaenocladius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.	4	9.70	0.23
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.	4	9.70	0.23
Psectrocladius sp.	4	9.70	0.23
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	8	19.40	0.46
Rheocricotopus sp.	8	19.40	0.46
Simulium vittatum complex	36	87.32	2.05
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group	16	38.81	0.91
Tipula sp.	4	9.70	0.23
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae	8	19.40	0.46
Physa sp.	192	465.70	10.93
BIVALVIA			
Pisidium sp.	20	48.51	1.14
Totals:	1756	4259.18	100.00

Total Density (N/m^2)	4259
Total Number of Taxa	32
Diversity (d)	3.47

Community Parameters	Kick Sample
Total Density (N/m^2)	4259
Diversity (d)	3.47
Total Number of Taxa	32
% Dominant Taxon	24.60
EPT Richness 2/1/0	3
EPT (abundance)	67.91
Chiron (abundance)	892.58
EPT/Chironomid ratio	0.08
Scraper (abundance)	582.12
Filterer (abundance)	135.83
SC/F ratio	4.29
Shredder (abundance)	38.81
SH/Total ratio	0.01
HBI	8.01
ICI	14

Relative Abundance by Order	
TURBELLARIA	1.37
NEMATODA	0
OLIGOCHAETA	49.20
HIRUDINEA	0.00
AMPHIPODA	0.23
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	1.14
ODONATA	1.14
PLECOPTERA	0.46
HEMIPTERA	0.00
TRICHOPTERA	0.00
COLEOPTERA	4.33
DIPTERA	29.61
GASTROPODA	11.39
BIVALVIA	1.14
Totals:	100.00

Density by Order	
TURBELLARIA	58
NEMATODA	0
OLIGOCHAETA	2096
HIRUDINEA	0
AMPHIPODA	10
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	49
ODONATA	49
PLECOPTERA	19
HEMIPTERA	0
TRICHOPTERA	0
COLEOPTERA	184
DIPTERA	1261
GASTROPODA	485
BIVALVIA	49
Totals:	4259

WO2

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti	1056	2223.41	43.85
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	48	101.06	1.99
Tubificidae without hair chaetae	112	235.82	4.65
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	8	16.84	0.33
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	24	50.53	1.00

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult	8	16.84	0.33
Agabus sp. larvae	48	101.06	1.99
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult	8	16.84	0.33
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae	8	16.84	0.33
Liodessus abjectus adult			
Neoporus dimidiatus adult	24	50.53	1.00
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	8	16.84	0.33
Chaetocladius sp.			
Chironomus sp.	136	286.35	5.65
Corynoneura sp.	16	33.69	0.66
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.	40	84.22	1.66
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

WO2 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.	8	16.84	0.33
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	32	67.38	1.33
Rheocricotopus sp.	672	1414.90	27.91
Simulium vittatum complex			
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.	8	16.84	0.33
Lymnaeidae			
Physa sp.	64	134.75	2.66
BIVALVIA			
Pisidium sp.	80	168.44	3.32
Totals:	2408	5070.04	100.00

Total Density (N/m^2)	5070
Total Number of Taxa	20
Diversity (d)	2.56

Community Parameters	Kick Sample
Total Density (N/m^2)	5070
Diversity (d)	2.56
Total Number of Taxa	20
% Dominant Taxon	43.85
EPT Richness 0/0/1	1
EPT (abundance)	50.53
Chiron (abundance)	1903.37
EPT/Chironomid ratio	0.03
Scraper (abundance)	151.60
Filterer (abundance)	168.44
SC/F ratio	0.90
Shredder (abundance)	50.53
SH/Total ratio	0.01
HBI	6.05
ICI	10

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	50.50
HIRUDINEA	0.00
AMPHIPODA	0.33
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	0.00
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.00
COLEOPTERA	3.99
DIPTERA	37.87
GASTROPODA	2.99
BIVALVIA	3.32
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	2560
HIRUDINEA	0
AMPHIPODA	17
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	0
ODONATA	0
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	51
COLEOPTERA	202
DIPTERA	1920
GASTROPODA	152
BIVALVIA	168
Totals:	5070

Sample Date: 12 November 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	35	73.69	38.89
Lumbricidae	11	23.16	12.22
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	40	84.22	44.44
Tubificidae without hair chaetae			
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA	1	2.11	1.11
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.			
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.			

WO3 (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult			
Berosus fraternus adult	1	2.11	1.11
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult	2	4.21	2.22
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.			
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.			
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.			
Simulium vittatum complex			
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
BIVALVIA			
Pisidium sp.			
Totals:	90	189.50	100.00

Total Density (N/m^2)	189
Total Number of Taxa	6
Diversity (d)	1.69

WO3

Community Parameters	Kick Sample
Total Density (N/m^2)	189
Diversity (d)	1.69
Total Number of Taxa	6
% Dominant Taxon	44.44
EPT Richness 0/0/0	0
EPT (abundance)	0.00
Chiron (abundance)	0.00
EPT/Chironomid ratio	0.00
Scraper (abundance)	0.00
Filterer (abundance)	0.00
SC/F ratio	0.00
Shredder (abundance)	0.00
SH/Total ratio	0.00
HBI	9.83
ICI	0

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	95.55
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0
ACARI	0.00
COLEMBOLA	1.11
EPHEMEROPTERA	0.00
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	0.00
COLEOPTERA	3.33
DIPTERA	0.00
GASTROPODA	0.00
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	181
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	2
EPHEMEROPTERA	0
ODONATA	0
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	0
COLEOPTERA	6
DIPTERA	0
GASTROPODA	0
BIVALVIA	0
Totals:	189

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	58	116.00	7.86
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	2	4.00	0.27
Lumbricidae			
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	26	52.00	3.52
Tubificidae without hair chaetae	208	416.00	28.18
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis	2	4.00	0.27
Mooreobdella fervida	6	12.00	0.81
AMPHIPODA			
Hyalella azteca	138	276.00	18.70
ACARI			
Arrenurus sp.	18	36.00	2.44
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA	2	4.00	0.27
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	8	16.00	1.08
Callibaetis sp.			
Fallceon quilleri	40	80.00	5.42
Leptophlebia sp.	2	4.00	0.27
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii	2	4.00	0.27
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	36	72.00	4.88

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae			
Anacaena sp. adult	4	8.00	0.54
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae			
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.	6	12.00	0.81
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	8	16.00	1.08
Chaetocladius sp.			
Chironomus sp.			
Corynoneura sp.			
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.			
Dixella sp.	2	4.00	0.27
Empididae			
Ephydridae			
Eukiefferiella sp.			
Heleniella sp.	2	4.00	0.27
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.			
Limonia sp.	4	8.00	0.54
Metriocnemus sp.			
Micropsectra sp.			
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.			
Paraphaenocladius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.	12	24.00	1.63
Parochlus sp.			
Pericoma sp.	2	4.00	0.27
Phaenopsectra sp.			
Pilaria sp.	16	32.00	2.17
Polypedilum sp.	6	12.00	0.81
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.	2	4.00	0.27
Radotanypus submarginella	2	4.00	0.27
Rheocricotopus sp.			
Simulium vittatum complex	4	8.00	0.54
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.	8	16.00	1.08
Thienemanniella sp.			
Thienemannimyia group	32	64.00	4.34
Tipula sp.	2	4.00	0.27
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	38	76.00	5.15
BIVALVIA			
Pisidium sp.	40	80.00	5.42
Totals:	738	1476.00	100.00

Total Density (N/m^2)	1476
Total Number of Taxa	32
Diversity (d)	3.62

RC1

Community Parameters	Kick Sample
Total Density (N/m^2)	1476
Diversity (d)	3.62
Total Number of Taxa	32
% Dominant Taxon	28.18
EPT Richness 3/0/1	4
EPT (abundance)	172.00
Chiron (abundance)	124.00
EPT/Chironomid ratio	1.39
Scraper (abundance)	76.00
Filterer (abundance)	104.00
SC/F ratio	0.73
Shredder (abundance)	96.00
SH/Total ratio	0.07
HBI	7.66
ICI	20

Relative Abundance by Order	
TURBELLARIA	7.86
NEMATODA	0
OLIGOCHAETA	31.98
HIRUDINEA	1.08
AMPHIPODA	18.70
DECAPODA	0
ACARI	2.44
COLEMBOLA	0.27
EPHEMEROPTERA	6.78
ODONATA	0.00
PLECOPTERA	0.00
HEMIPTERA	0.27
TRICHOPTERA	4.88
COLEOPTERA	0.54
DIPTERA	14.63
GASTROPODA	5.15
BIVALVIA	5.42
Totals:	100.00

Density by Order	
TURBELLARIA	116
NEMATODA	0
OLIGOCHAETA	472
HIRUDINEA	16
AMPHIPODA	276
DECAPODA	0
ACARI	36
COLEMBOLA	4
EPHEMEROPTERA	100
ODONATA	0
PLECOPTERA	0
HEMIPTERA	4
TRICHOPTERA	72
COLEOPTERA	8
DIPTERA	216
GASTROPODA	76
BIVALVIA	80
Totals:	1476

Sample Date: 25 October 2002

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	320	888.16	9.13
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	8	22.20	0.23
Lumbricidae	16	44.41	0.46
Nais communis	352	976.98	10.05
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata	32	88.82	0.91
Tubificidae with hair chaetae			
Tubificidae without hair chaetae	272	754.94	7.76
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis	8	22.20	0.23
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca	200	555.10	5.71
ACARI			
Arrenurus sp.	16	44.41	0.46
Hygrobates sp.	40	111.02	1.14
Lebertia sp.	8	22.20	0.23
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	872	2420.24	24.89
Callibaetis sp.			
Fallceon quilleri	200	555.10	5.71
Leptophlebia sp.	16	44.41	0.46
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum	48	133.22	1.37
Argia sp.	16	44.41	0.46
Coenagrionidae	88	244.24	2.51
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.	16	44.41	0.46
Limnephilidae			
Limnephilus sp.	48	133.22	1.37

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	8	22.20	0.23
Anacaena sp. adult	8	22.20	0.23
Berosus fraternus adult			
Cymbiodyta sp. adult	16	44.41	0.46
Gymnochthebius falli adult			
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult	16	44.41	0.46
Hydroporinae larvae	16	44.41	0.46
Liodessus abjectus adult	8	22.20	0.23
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult	8	22.20	0.23
Sanfilippodytes sp. adult			
Tropisternus columbianus adult	8	22.20	0.23
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.			
Bittacomorpha sp.	16	44.41	0.46
Brillia sp.			
Caloparyphus sp.			
Ceratopogonidae	16	44.41	0.46
Chaetocladius sp.			
Chironomus sp.	8	22.20	0.23
Corynoneura sp.	24	66.61	0.68
Cricotopus sp.			
Cryptochironomus sp.			
Culicidae			
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.			
Dicrotendipes sp.	8	22.20	0.23
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.	8	22.20	0.23
Heleniella sp.	8	22.20	0.23
Hemerodromia sp.			
Heterotrissocladius sp.	16	44.41	0.46
Hydrobaenus sp.	16	44.41	0.46
Limnophora sp.			
Limnophyes sp.			
Limonia sp.			
Metriocnemus sp.	24	66.61	0.68
Micropsectra sp.	48	133.22	1.37
Pagastia sp.			
Paramerina sp.	8	22.20	0.23
Parametriocnemus sp.			
Paraphaenocladius sp.			

RC1M (Continued)

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.	8	22.20	0.23
Paratendipes sp.	32	88.82	0.91
Parochlus sp.			
Pericoma sp.	8	22.20	0.23
Phaenopsectra sp.			
Pilaria sp.	8	22.20	0.23
Polypedilum sp.	16	44.41	0.46
Psectrocladius sp.			
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.			
Ptychoptera sp.			
Radotanypus submarginella	16	44.41	0.46
Rheocricotopus sp.			
Simulium vittatum complex	160	444.08	4.57
Simulium sp.			
Smittia sp.			
Stictochironomus sp.			
Tanytarsus sp.	48	133.22	1.37
Thienemanniella sp.			
Thienemannimyia group	8	22.20	0.23
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	48	133.22	1.37
BIVALVIA			
Pisidium sp.	288	799.34	8.22
Totals:	3504	9725.35	100.00

Total Density (N/m^2)	9725
Total Number of Taxa	50
Diversity (d)	4.10

Community Parameters	Kick Sample
Total Density (N/m^2)	9725
Diversity (d)	4.10
Total Number of Taxa	50
% Dominant Taxon	24.89
EPT Richness 3/0/2	5
EPT (abundance)	3197.38
Chiron (abundance)	821.55
EPT/Chironomid ratio	3.89
Scraper (abundance)	177.63
Filterer (abundance)	1376.65
SC/F ratio	0.13
Shredder (abundance)	177.63
SH/Total ratio	0.02
HBI	7.03
ICI	32

Relative Abundance by Order	
TURBELLARIA	9.13
NEMATODA	0
OLIGOCHAETA	19.41
HIRUDINEA	0.23
AMPHIPODA	5.71
DECAPODA	0
ACARI	1.83
COLEMBOLA	0.00
EPHEMEROPTERA	31.05
ODONATA	4.34
PLECOPTERA	0.00
HEMIPTERA	0.00
TRICHOPTERA	1.83
COLEOPTERA	2.51
DIPTERA	14.38
GASTROPODA	1.37
BIVALVIA	8.22
Totals:	100.00

Density by Order	
TURBELLARIA	888
NEMATODA	0
OLIGOCHAETA	1887
HIRUDINEA	22
AMPHIPODA	555
DECAPODA	0
ACARI	178
COLEMBOLA	0
EPHEMEROPTERA	3020
ODONATA	422
PLECOPTERA	0
HEMIPTERA	0
TRICHOPTERA	178
COLEOPTERA	244
DIPTERA	1399
GASTROPODA	133
BIVALVIA	799
Totals:	9725

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.	8	19.40	0.28
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae			
Lumbricidae			
Nais communis	480	1164.24	16.85
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata	16	38.81	0.56
Tubificidae with hair chaetae	176	426.89	6.18
Tubificidae without hair chaetae	208	504.50	7.30
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca			
ACARI			
Arrenurus sp.			
Hygrobates sp.	32	77.62	1.12
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis			
Callibaetis sp.	304	737.35	10.67
Fallceon quilleri	8	19.40	0.28
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae	16	38.81	0.56
PLECOPTERA			
Capnura wanica			
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera	32	77.62	1.12
Notonecta kirbyi	1	2.43	0.04
Notonecta undulata			
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.	32	77.62	1.12

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	104	252.25	3.65
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult			
Haliplus immaculicollis adult	8	19.40	0.28
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae	8	19.40	0.28
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae	8	19.40	0.28
Peltodytes edentulus adult			
Rhantus gutticollis adult	8	19.40	0.28
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult	8	19.40	0.28
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.			
Apedilum sp.	16	38.81	0.56
Bittacomorpha sp.			
Brillia sp.	24	58.21	0.84
Caloparyphus sp.			
Ceratopogonidae	8	19.40	0.28
Chaetocladius sp.	8	19.40	0.28
Chironomus sp.	328	795.56	11.51
Corynoneura sp.	64	155.23	2.25
Cricotopus sp.	56	135.83	1.97
Cryptochironomus sp.			
Culicidae	32	77.62	1.12
Culiseta sp.			
Dasyhelea sp.			
Diamesa sp.	40	97.02	1.40
Dicrotendipes sp.	40	97.02	1.40
Dixella sp.			
Empididae			
Ephydridae			
Eukiefferiella sp.	24	58.21	0.84
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.			
Limnophora sp.			
Limnophyes sp.	16	38.81	0.56
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.	136	329.87	4.77
Pagastia sp.			
Paramerina sp.			
Parametriocnemus sp.	24	58.21	0.84
Paraphaenocladius sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.			
Pericoma sp.			
Phaenopsectra sp.	112	271.66	3.93
Pilaria sp.			
Polypedilum sp.			
Psectrocladius sp.			
Pseudochironomus sp.	8	19.40	0.28
Pseudodiamesa sp.			
Pseudosmittia sp.	8	19.40	0.28
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.	16	38.81	0.56
Simulium vittatum complex	248	601.52	8.70
Simulium sp.	8	19.40	0.28
Smittia sp.			
Stictochironomus sp.	8	19.40	0.28
Tanytarsus sp.	128	310.46	4.49
Thienemanniella sp.	8	19.40	0.28
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.	32	77.62	1.12
BIVALVIA			
Pisidium sp.			
Totals:	2849	6910.25	100.00

Total Density (N/m^2)	6910
Total Number of Taxa	42
Diversity (d)	4.23

Community Parameters	Kick Sample
Total Density (N/m^2)	6910
Diversity (d)	4.23
Total Number of Taxa	42
% Dominant Taxon	16.85
EPT Richness 2/0/1	3
EPT (abundance)	834.37
Chiron (abundance)	2580.73
EPT/Chironomid ratio	0.32
Scraper (abundance)	368.68
Filterer (abundance)	931.39
SC/F ratio	0.40
Shredder (abundance)	271.66
SH/Total ratio	0.04
HBI	8.01
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.28
NEMATODA	0
OLIGOCHAETA	30.89
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0
ACARI	1.12
COLEMBOLA	0.00
EPHEMEROPTERA	10.95
ODONATA	0.56
PLECOPTERA	0.00
HEMIPTERA	1.16
TRICHOPTERA	1.12
COLEOPTERA	5.05
DIPTERA	47.74
GASTROPODA	1.12
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	19
NEMATODA	0
OLIGOCHAETA	2134
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	78
COLEMBOLA	0
EPHEMEROPTERA	757
ODONATA	39
PLECOPTERA	0
HEMIPTERA	80
TRICHOPTERA	78
COLEOPTERA	349
DIPTERA	3299
GASTROPODA	78
BIVALVIA	0
Totals:	6910

Sample Date: 25 October 2002

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
TURBELLARIA			
Dugesia sp.			
OLIGOCHAETA			
Aulodrilus piqueti			
Dero (Dero) nivea			
Enchytraeidae	16	42.80	0.12
Lumbricidae			
Nais communis			
Nais variabilis			
Pristina aequiseta			
Slavina appendiculata			
Tubificidae with hair chaetae	32	85.60	0.24
Tubificidae without hair chaetae	128	342.40	0.95
HIRUDINEA			
Erpobdellidae			
Helobdella stagnalis			
Mooreobdella fervida			
AMPHIPODA			
Hyalella azteca			
ACARI			
Arrenurus sp.			
Hygrobates sp.			
Lebertia sp.			
Sperchon sp.			
COLLEMBOLA			
EPHEMEROPTERA			
Baetis notos			
Baetis tricaudatus			
Caenis bajaensis	16	42.80	0.12
Callibaetis sp.	928	2482.40	6.89
Fallceon quilleri			
Leptophlebia sp.			
Tricorythodes minutus			
ODONATA			
Aeshna sp.			
Amphiagrion abbreviatum			
Argia sp.			
Coenagrionidae			
PLECOPTERA			
Capnura wanica	688	1840.40	5.11
HEMIPTERA			
Aquarius remigis			
Corisella inscripta			
Corisella tarsalis			
Limnoporus notabilis			
Macrovelia hornii			
Microvelia cerifera			
Notonecta kirbyi			
Notonecta undulata	16	42.80	0.12
Trichocorixa borealis			
TRICHOPTERA			
Cheumatopsyche sp.			
Hydropsyche sp.			
Hydroptila sp.			
Limnephilidae			
Limnephilus sp.			

Taxon	Kick Sample n	N/m^2	Relative Abundance (%)
COLEOPTERA			
Agabus semivittatus adult			
Agabus sp. larvae	64	171.20	0.48
Anacaena sp. adult			
Berosus fraternus adult			
Cymbiodyta sp. adult			
Gymnochthebius falli adult	16	42.80	0.12
Haliplus immaculicollis adult			
Haliplus sp. larvae			
Hydraena sp. adult			
Hydroporinae larvae	16	42.80	0.12
Liodessus abjectus adult			
Neoporus dimidiatus adult			
Ochthebius sp. adult			
Optioservus sp. larvae			
Peltodytes edentulus adult			
Rhantus gutticollis adult			
Sanfilippodytes sp. adult			
Tropisternus columbianus adult			
Tropisternus sublaevis adult			
Zaitzevia parvula larvae			
DIPTERA			
Acricotopus sp.	128	342.40	0.95
Apedilum sp.	272	727.60	2.02
Bittacomorpha sp.			
Brillia sp.	64	171.20	0.48
Caloparyphus sp.			
Ceratopogonidae			
Chaetocladius sp.	208	556.40	1.54
Chironomus sp.	1392	3723.60	10.33
Corynoneura sp.	752	2011.60	5.58
Cricotopus sp.	720	1926.00	5.34
Cryptochironomus sp.			
Culicidae	64	171.20	0.48
Culiseta sp.	48	128.40	0.36
Dasyhelea sp.			
Diamesa sp.	144	385.20	1.07
Dicrotendipes sp.	464	1241.20	3.44
Dixella sp.			
Empididae			
Ephydridae	32	85.60	0.24
Eukiefferiella sp.	48	128.40	0.36
Heleniella sp.			
Hemerodromia sp.			
Heterotrissocladius sp.			
Hydrobaenus sp.	192	513.60	1.43
Limnophora sp.	16	42.80	0.12
Limnophyes sp.	32	85.60	0.24
Limonia sp.			
Metriocnemus sp.			
Micropsectra sp.	3840	10272.00	28.50
Pagastia sp.	208	556.40	1.54
Paramerina sp.	64	171.20	0.48
Parametriocnemus sp.	32	85.60	0.24
Paraphaenocladius sp.			

RC3 (Continued)

Taxon	Kick Sample n	Kick Sample N/m^2	Relative Abundance (%)
DIPTERA (Continued)			
Paratanytarsus sp.			
Paratendipes sp.			
Parochlus sp.	16	42.80	0.12
Pericoma sp.			
Phaenopsectra sp.	240	642.00	1.78
Pilaria sp.			
Polypedilum sp.	16	42.80	0.12
Psectrocladius sp.	528	1412.40	3.92
Pseudochironomus sp.			
Pseudodiamesa sp.			
Pseudosmittia sp.	32	85.60	0.24
Ptychoptera sp.			
Radotanypus submarginella			
Rheocricotopus sp.	1856	4964.80	13.78
Simulium vittatum complex	128	342.40	0.95
Simulium sp.			
Smittia sp.			
Stictochironomus sp.	16	42.80	0.12
Tanytarsus sp.			
Thienemanniella sp.			
Thienemannimyia group			
Tipula sp.			
GASTROPODA			
Fossaria obrussa			
Gyraulus sp.			
Lymnaeidae			
Physa sp.			
BIVALVIA			
Pisidium sp.			
Totals:	13472	36037.60	100.00

Total Density (N/m^2)	36038
Total Number of Taxa	38
Diversity (d)	3.71

Community Parameters	Kick Sample
Total Density (N/m^2)	36038
Diversity (d)	3.71
Total Number of Taxa	38
% Dominant Taxon	28.50
EPT Richness 2/1/0	3
EPT (abundance)	4365.60
Chiron (abundance)	30131.20
EPT/Chironomid ratio	0.14
Scraper (abundance)	642.00
Filterer (abundance)	342.40
SC/F ratio	1.88
Shredder (abundance)	3980.40
SH/Total ratio	0.11
HBI	6.93
ICI	20

Relative Abundance by Order	
TURBELLARIA	0.00
NEMATODA	0
OLIGOCHAETA	1.31
HIRUDINEA	0.00
AMPHIPODA	0.00
DECAPODA	0
ACARI	0.00
COLEMBOLA	0.00
EPHEMEROPTERA	7.01
ODONATA	0.00
PLECOPTERA	5.11
HEMIPTERA	0.12
TRICHOPTERA	0.00
COLEOPTERA	0.71
DIPTERA	85.75
GASTROPODA	0.00
BIVALVIA	0.00
Totals:	100.00

Density by Order	
TURBELLARIA	0
NEMATODA	0
OLIGOCHAETA	471
HIRUDINEA	0
AMPHIPODA	0
DECAPODA	0
ACARI	0
COLEMBOLA	0
EPHEMEROPTERA	2525
ODONATA	0
PLECOPTERA	1840
HEMIPTERA	43
TRICHOPTERA	0
COLEOPTERA	257
DIPTERA	30902
GASTROPODA	0
BIVALVIA	0
Totals:	36038

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