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A Cost Effective Approach to Taxonomic Resolution For Bioassessment and Monitoring Programs in the State of Georgia

Jodi Alene Williams

Columbus State University, williams_jodi1@columbusstate.edu

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**A COST EFFECTIVE APPROACH TO TAXONOMIC RESOLUTION
FOR BIOASSESSMENT AND MONITORING PROGRAMS IN THE STATE OF GEORGIA**

Jodi Alene Williams



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Columbus State University
The College of Science
The Graduate Program in Environmental Science

A cost effective approach to taxonomic resolution
for bioassessment and monitoring programs in the State of Georgia

A Thesis in
Environmental Science
by
Jodi Alene Williams

Submitted in Partial Fulfillment
of the Requirements
for the Degree of
Master of Science

Date
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I have submitted this thesis in partial fulfillment of the requirements for the degree of Master of Science.

29 July 2004
Date

Jodi Alene Williams
Jodi Alene Williams

We approve the thesis of Jodi Alene Williams as presented here.

29 July 2004
Date

James A. Gore
James A. Gore, Professor of
Environmental Science, Thesis Advisor

29 July 2004
Date

George E. Stanton
George E. Stanton, Dean, College of
Science

29 July 2004
Date

Harlan J. Hendricks
Harlan J. Hendricks, Associate Professor
of Biology

ABSTRACT

The Georgia Ecoregions Reference Sites Project has developed biological criteria for streams in Georgia according to the *Rapid Bioassessment Protocols For Wadeable Streams and Rivers*. Streams will ultimately be classified into categories of impairment so that management decisions can be made in accordance with the Clean Water Act. A cost-effective approach to accomplish mandates set forth by the Clean Water Act must be employed, as state budgets are limited. One means of examining costs is to assess taxonomic resolution. Taxonomic resolution not only assesses the sensitivity of biocriteria, it also allows one to make recommendations to state agencies regarding the costs and benefits of recommended taxonomic identification requirements. Due to the broad diversity in geology, topography, climate, soils and geography within Georgia, taxonomic resolution requirements may vary. Thirty macroinvertebrate samples from five reference condition streams and five or six impaired streams from three Georgia sub-ecoregions were identified to "lowest possible" or lowest practical level. Lowest practical level includes many taxonomic levels determined by the group identified and the availability of peer-reviewed keys. Specific data from lowest practical level were reduced to generic level then further reduced to familial level so that three identification levels, incorporated into sub-ecoregional specific invertebrate indices, were assessed for discriminatory ability. Time spent on identification was recorded at each taxonomic level so that identification "costs" versus "benefits" or degree of information could be used in conjunction with the indices in determining recommended taxonomic resolution requirements. Final analysis indicated taxonomic resolution requirements vary among subecoregions within Georgia and future benthic work, at least in some subecoregions, will require less time and money. By performing cost/benefit analyses, agencies involved in bioassessment and biomonitoring programs can identify regions that may require less taxonomic effort.

TABLE OF CONTENTS

ABSTRACT	<i>iii</i>
TABLE OF CONTENTS	<i>iv</i>
LIST OF TABLES	v
LIST OF FIGURES	<i>vi</i>
ACKNOWLEDGEMENTS	<i>vii</i>
INTRODUCTION	1
METHODS	8
RESULTS	17
DISCUSSION	31
CONCLUSIONS	42
REFERENCES	44
APPENDIX A – MAPS	48
APPENDIX B – TAXA LISTS AND TAXA REFERENCES	51

LIST OF TABLES

Table		Page
1	Candidate benthic metrics and predicted direction of metric response to increasing perturbation (Hughes 2004)	13
2	Metric categories, metrics compiled into invertebrate indices (Hughes 2004) and metric discrimination efficiencies (DE's) for three levels of taxonomy for three subcoregions	18
3	Stream index scores and index discrimination efficiencies (DE's) for the Southern Inner Piedmont	20
4	Stream index scores and index discrimination efficiencies (DE's) for the Sand Hills	20
5	Stream index scores and index discrimination efficiencies (DE's) for the Southern Metasedimentary Mountains	21
6	Mounting time and identification (ID) time for twelve samples	28
7	Southern Inner Piedmont identification (ID) and mounting times	29
8	Sand Hills identification (ID) and mounting times	30
9	Southern Metasedimentary Mountains identification (ID) and mounting times	30
10	Stream diversity values for Southern Inner Piedmont, Sand Hills, and Southern Metasedimentary Mountains	35

LIST OF FIGURES

Figure		Page
1	Level III and IV Ecoregions of Georgia (Griffith <i>et al.</i> 2001)	11
2	Southern Inner Piedmont box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions	22
3	Sand Hills box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions	24
4	Southern Metasedimentary Mountains box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions	26

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INTRODUCTION.

Water is an essential resource for life and with human populations continually expanding our water resources are becoming depleted. In fact, in some geographical areas, current usage exceeds long-term availability. Furthermore, water that is available is quickly becoming degraded by anthropogenic activities. Water resources must be managed at local, regional, national and global levels to ensure future supplies. Human society is a living system that depends on other living systems for its success; therefore, managing water resources must include the protection of aquatic ecosystems. "The decline in the distribution, abundance, and quality of water and aquatic ecosystems thus represents a threat to the sustainability of all living systems and the quality and long-term viability of human society" (Karr 1995). As Norman Myers (1993) stated, "Our future will be deeply compromised unless we learn to manage water as a critical ingredient of our lives."

To establish goals for the restoration and protection of freshwater ecosystems in the United States, Congress passed the 1972 Clean Water Act (CWA) (33 U.S.C. § *et seq.*) which mandates the improvement of stream conditions in each state. The objective of the act is "to restore and maintain the chemical, physical and biological integrity of the nation's waters." (Clean Water Act, §101(a), 33 U.S.C., 1251(a), 1999). Biological integrity, as defined by Karr and Dudley (1981), is the ability of an aquatic ecosystem, to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of

the natural habitats of a region. Therefore, individual states, as required by the United States Environmental Protection Agency (EPA) and in compliance with Section 319 of the Clean Water Act (Clean Water Act §319, 33 U.S.C., §1329, 1999) must develop biological criteria (biocriteria), based on biological assessment (bioassessment), and implement these biocriteria into State Water Quality Standards so that impacted waters are identified and evaluated for nonpoint sources of pollution (NPS). Bioassessments provide an integrated assessment of water quality when combined with measurements of chemistry and habitat because they directly measure biologic integrity and indirectly measure physical and chemical integrity. The EPA has published guidelines on developing bioassessment systems for use by states, called the Rapid Bioassessment Protocols (RBP's) (Barbour *et al.* 1999) and for biocriteria (Gibson *et al.* 1996).

Traditionally, water quality assessment has been performed almost exclusively by chemical analysis. More recently however, water quality has included the assessment of ecological integrity by using indicator organisms such as fish, periphyton or macroinvertebrates. Benthic macroinvertebrates, those large invertebrates that inhabit the bottom substrates, are often used in bioassessments as indicators of water quality because they offer many advantages. First, they are ubiquitous and therefore are affected by perturbations that occur in different types of habitats within the water (Lenat *et al.*

1980). Second, the large number of benthic species typically collected from a sample can provide a full range of responses to stress (Hellawell 1986, Abel 1989). Third, their sedentary nature allows for spatial analysis of pollutant or disturbance effects (Slack *et al.*, 1973, Hawkes 1979, Penny 1985, Hellawell 1986, Abel 1989). Finally, the life cycles of macroinvertebrates are long in comparison to other groups, allowing for elucidation of temporal changes caused by perturbations (Gaufrin 1973, Slack *et al.* 1973, Weber 1973, Lenat *et al.* 1980, Penny 1985, Hellawell 1986, Abel 1989). As a result, benthic macroinvertebrates are continuous monitors of the water they inhabit (Hawkes 1979). Thus, they more accurately reflect chronic conditions than might be indicated by more mobile fish species or short-lived periphyton.

Qualitative approaches using benthic macroinvertebrate assemblages, such as rapid assessment approaches, have recently been accepted as a means to identify water quality problems due to point and non-point source pollution, and to document long-term regional changes in water quality (Barbour *et al.* 1999). Rapid assessments reduce effort and associated costs in evaluating a site in relation to quantitative techniques by (1) reducing the number of habitats sampled and replicate sample units taken per habitat; (2) collecting less silt and particulate matter making sorting faster and easier; (3) considering only a fraction of the animals collected thus reducing time spent on identification; and (4) identifying organisms to family or higher taxonomic levels. Rapid assessment

approaches can also provide summary information of study sites in a way that can be understood by non-specialists such as managers, the general public and decision-makers (Resh and Jackson 1993). This form of water quality analysis is accomplished by expressing analytical measures (metrics) as single scores and then placing the scores in categories of varying water quality based on regional background data. The EPA's Rapid Bioassessment Protocols (RPB), although not strictly qualitative, is one method that is frequently employed because elements of both qualitative and quantitative approaches are working in conjunction so that results are achieved in a timely manner.

Although rapid bioassessments are efficient, not all bioassessment protocols allow for identification of organisms to family or higher taxonomic levels. There is considerable debate as to the taxonomic resolution of macroinvertebrates necessary to accurately determine community condition in bioassessments. Resh and Unzicker (1975) have demonstrated that component species for 61 of the 89 genera for which water-quality tolerances have been established fall into different tolerance categories. They stress the importance of species level or "lowest practical level" due to the substantial variation among species within genera and families and their different responses when exposed to various kinds of pollution. Hawkins *et al.* (2000) concluded that, in taxonomically rich areas, it was necessary to identify to the genus or species

level in order to explain variation among communities, but in areas of little taxonomic diversity they found that family level was sufficient.

Although a diverse benthic fauna in streams suggests the need for generic or specific levels of identification, it has not been determined whether the aquatic ecosystems in taxonomically rich regions respond to stressors more consistently at the genus or species level than at the family level. Greater variation in species from site to site may reduce the ability to detect a deviation from the unimpaired or minimally impaired stream (*i.e.*, the reference condition), and information gained from the genus level may represent ecological noise depending on the specificity of the benthic community's response to stress (Bailey *et al.* 2001). In addition, species-level identification is not always possible because immature stages are collected and species designations are based on the morphological characteristics of adult insects or larval-adult associations (Lenat and Resh 2001). The lack of complete knowledge of each species' environmental requirements may result in arbitrarily assigning existing knowledge that has been derived at the generic or familial level resulting in similar summary information when the different taxonomic levels are compared (Lenat and Resh 2001).

With varying taxonomic resolution, Bowman and Bailey (1997) found little effect on multivariate descriptions of variation among communities, particularly when comparing reference sites to impaired sites. They argued that sufficient

resolution for sensitive and accurate bioassessments is achieved when organisms are identified to family level or higher.

To be effective in evaluation of stream impairment, organisms identified to genus or species level must provide significantly more descriptive information than family level, and they must enable better detection of departure from reference condition or the resources expended on taxonomic identification will not be cost effective (Bailey *et al.*, 2001).

As the RBP continues to increase in application across the United States, it will become necessary to resolve the issue of taxonomic resolution, not only to assess the sensitivity of the assessment, but also to make recommendations to state agencies regarding the costs and benefits of recommended identification levels.

The purpose of this research was to determine if departure of macroinvertebrate metric scores from the reference condition was easier to detect with generic or specific identifications than identification to family level.

The results presented here were part of the third phase of the Georgia Ecoregions Reference Sites Project conducted for the Georgia Department of Natural Resources (GA DNR) by Columbus State University (CSU) as described in the quality assurance program plan (Columbus State University 2000). The project was performed in four phases. Phase I of the project delineated Georgia ecoregions and subcoregions and selected reference sites. Phase II focused

on the physical, chemical and biological characterization of reference stream conditions. As part of the biological component of reference stream characterization, the structure of the benthic macroinvertebrate community was broken into a group of metrics and candidate invertebrate indices were developed for each subcoregion (Hughes 2004). Phase III applied the indices to impaired streams as a means to develop a numerical classification system whereas Phase IV categorized stream impairment. The subcoregional invertebrate indices developed for Phase II were the means by which I assessed taxonomic variability.

METHODS.

Bioassessment of aquatic ecosystems using benthic macroinvertebrates involves sampling the community at each of a set of sites and then comparing the community structure and composition at a test site with a reference site or reference condition (Reynoldson *et al.* 1997).

Benthic macroinvertebrates used in this study were collected using the multi-habitat approach or 20-jab method according to the Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers (Barbour *et al.*, 1999) for Phase II and Phase III of the Georgia Ecoregions Reference Sites Project. Systematically, samples were collected from different types of habitat within a representative portion of the stream (100-meter reach). By kicking the substrate and jabbing with a D-frame dip net, a total of twenty jabs were taken from different habitat types proportionate to their representation of total habitat in the reach and combined to obtain a single homogenous sample. Samples were transferred from the net to 1-liter plastic storage containers, properly labeled internally and externally, preserved with 95% ethanol and transported to CSU where they were stored. Each container was assigned a serial log number that was recorded in a field notebook and on chain-of-custody forms to indicate the person responsible for the samples. When the samples were delivered to the CSU laboratory, the lab manager assumed custody (Columbus State University 2000).

In addition to the biological samples collected, chemical and physical data were measured and recorded in the field for use in characterizing reference

conditions. *In situ* chemical data such as pH, dissolved oxygen (DO), turbidity, and conductivity were obtained by using a Hydrolab H20® Water Quality Multiprobe/Scout® 2 Display Unit (Columbus State University 2000). Water temperature and depth was also measured with the Hydrolab H20®. Physical data measured included visual habitat assessment, characterization of general land use, description of stream origin and type, and summary of riparian vegetation, substrate, and stream morphology (Barbour *et al.* 1999).

In the lab, samples were processed and subsampled based on a fixed-count (200 organisms) approach and macroinvertebrates were identified to the lowest practical level using compound microscopes and peer-reviewed taxonomic references (Appendix B) as stipulated in the Phase III QAPP (Columbus State University 2001).

Before identification, chironomid larvae were mounted on slides in CMCP-10, a highly viscous mounting and clearing agent and stored in slide cases. All other specimens were stored in vials of denatured 70% ethanol and tightly capped. Each vial had an interior label and an exterior stick-on label indicating sample location, sample identifier and date. For each sample, bench sheets were used to record cumulative count of taxon, life stages, and time spent on taxonomic resolution. Any difficulties encountered during identification (e.g., missing gills or no species key available) were noted on the bench sheets. A Taxonomic Certainty Rating (TCR), ranging from one to five, (used as a measure of confidence) with the lowest value (1) representing greatest confidence in

identification, was also recorded on the bench sheets. TCR's of three or greater were accompanied by an explanation.

Biological samples, each containing about 200 individuals, were collected from 31 sites, identified, and evaluated for taxonomic resolution. To represent a spectrum of the diversity in underlying geology and geography of the state, which ultimately affects aquatic biological communities, ten samples from the Blue-ridge Mountain Ecoregion and the Piedmont Ecoregion and eleven samples from the Southeastern Plains Ecoregion were examined. Because recent drought conditions affected the number of streams that could be sampled in some regions of the state, specific subcoregions, having at least ten sampled sites, were chosen for this study to ensure timely analysis. The subcoregions selected were the Southern Metasedimentary Mountains (66g), the Southern Inner Piedmont (45a), and the Sand Hills (65c). Locations of the thirty-one catchments sampled for this study are depicted on the maps in Appendix A. Five of the total catchments sampled from each subcoregion represented reference condition and five or six catchments sampled, depending on the subcoregion, had some degree of impairment as defined by Gore *et al.* (2004).

Georgia's six ecoregions and twenty-eight subcoregions are depicted in Figure 1.

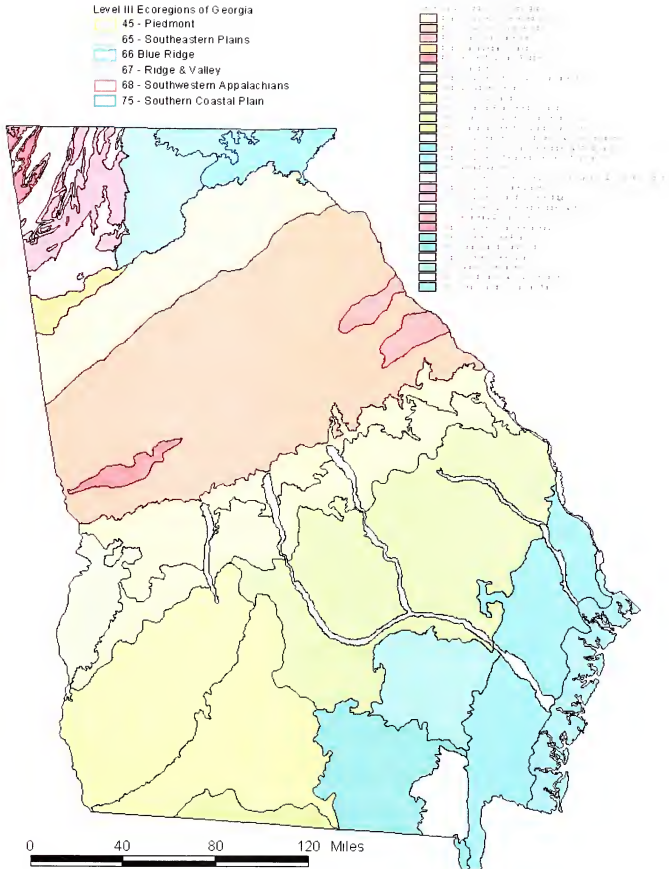


Figure 1. Level III and IV Ecoregions of Georgia (Griffith *et al.* 2001).

Candidate benthic metrics (Table 1) were used for characterizing each reference stream. These metrics were standardized on a 100-point scale and evaluated for discrimination potential. The metrics with the highest discrimination efficiency (DE) were compiled into ecoregional and subcoregional indices (Hughes 2004) and recommended as being the best indices for differentiating impaired and reference conditions (Gore *et al.* 2004).

Metrics incorporated into the subcoregional indices were used to evaluate taxonomic resolution at the lowest practical level (LPL), at the generic level, and at the familial level. When compiling invertebrate indices the metrics that did not apply at the generic and familial identification levels were considered non-valid and were omitted from the index. Index discrimination efficiencies were computed by using the 25th percentile of reference condition scores. A 25th percentile is considered sufficiently conservative to protect aquatic resources and still allow for some uncertainty of reference condition sites (Jessup and Gerritsen 2000). The 25th percentile of reference condition scores is used as a threshold value for management action since impairment measurements, as an index score, fall along a continuum. A threshold reflects the risk and uncertainty of misclassification of stream health: the risk of declaring a good stream as impaired (Type-I error) and the risk of declaring an impaired stream good (Type-II error) (Jessup and Gerritsen 2000). Box and whisker plots were used to exhibit distribution of reference condition and impaired index scores and for evaluating taxonomic resolution requirements.

Table 1. Candidate benthic metrics and predicted direction of metric response to increasing perturbation (Hughes 2004).

METRIC	STRESS RESPONSE	SOURCE	NOTES
Total Taxa	Decrease	Barbour <i>et al.</i> 1999	
EPT Taxa	Decrease	Barbour <i>et al.</i> 1999	
Ephemeroptera Taxa	Decrease	Barbour <i>et al.</i> 1999	
Plecoptera Taxa	Decrease	Barbour <i>et al.</i> 1999	
Trichoptera Taxa	Decrease	Barbour <i>et al.</i> 1999	
Coleoptera Taxa	Decrease	Barbour <i>et al.</i> 1996	
Diptera Taxa	Decrease	Barbour <i>et al.</i> 1999	
Chironomidae Taxa	Decrease	Barbour <i>et al.</i> 1999	
Tanytarsini Taxa	Decrease	Barbour <i>et al.</i> 1996	
Evenness	Decrease	general literature (Barbour <i>et al.</i> 1999)	
Margalef Index	Decrease	general literature (Barbour <i>et al.</i> 1999)	
Shannon-Wiener_base_e	Decrease	Stribling <i>et al.</i> 2000/ Barbour <i>et al.</i> 1996	
Simpson's Diversity	Increase	Stribling <i>et al.</i> 2000	
EPT Pct	Decrease	Barbour <i>et al.</i> 1999	
Ephemeroptera Pct	Decrease	Barbour <i>et al.</i> 1999	
Amphipoda Pct	Decrease	Barbour <i>et al.</i> 1996	
Bival Pct	UNKNOWN	UNKNOWN	
Chironomidae Pct	Increase	Barbour <i>et al.</i> 1999	
Coleoptera Pct	Decrease	Barbour <i>et al.</i> 1996	
Diptera Pct	Increase	Barbour <i>et al.</i> 1999	
Gastropoda Pct	Decrease	Barbour <i>et al.</i> 1996	
Isopoda Pct	Increase	Barbour <i>et al.</i> 1996	
NonInsect Pct	Increase	Barbour <i>et al.</i> 1999	
Odonata Pct	Increase	Barbour <i>et al.</i> 1996	
Plecoptera Pct	Decrease	Barbour <i>et al.</i> 1999	

Table 1. cont.

Tanytarsini Pct	Decrease	Barbour <i>et al.</i> 1999	WV & Rockdale also say increase
Oligochaeta Pct	Variable/Increase	Barbour <i>et al.</i> 1999/Gerritsen and Leppo 2000	
Trichoptera Pct	Decrease	Barbour <i>et al.</i> 1999	RBP Subfamily Tolerance Value
%Chironominae/TC	Variable	Barbour <i>et al.</i> 1999	RBP Subfamily Tolerance Value
%Orthoclaadiinae/TC	Decrease	Barbour <i>et al.</i> 1999	RBP Subfamily Tolerance Value
%Tanypodinae/TC	Increase	Barbour <i>et al.</i> 1999	
Hydropsychidae/Trichoptera	Increase	Barbour <i>et al.</i> 1999	Inferred/RBP
Hydropsychidae/EPT	Increase	Barbour <i>et al.</i> 1999	Inferred/RBP
Tanytarsini/TC	Decrease	Barbour <i>et al.</i> 1999	
Baetidae/Ephemeroptera	UNKNOWN	UNKNOWN	
<i>Cricotopus</i> & <i>Chironomus</i> /TC	Increase	Barbour <i>et al.</i> 1999	RBP Genera Tolerance Values
Tolerant Taxa	Increase	Barbour <i>et al.</i> 1999	Inferred/RBP
Tolerant Pct	Increase	Barbour <i>et al.</i> 1999	
Intolerant Taxa	Decrease	Barbour <i>et al.</i> 1999	
Intolerant Pct	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP
Dominant01 Pct	Increase	Barbour <i>et al.</i> 1999	
Dominant01 Individuals	Increase	Barbour <i>et al.</i> 1999	
BeckBI	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP (Florida index increases)
HBI	Increase	Barbour <i>et al.</i> 1999	
NCBI	Increase	Lenat 1993	
Scraper Pct	Decrease	Barbour <i>et al.</i> 1999	

Table 1. cont.

Scraper Taxa	Decrease	Gerritsen and Leppo 2000	WV also says decrease
Collector Pct	Decrease	Gerritsen and Leppo 2000	
Collector Taxa	Decrease	Gerritsen and Leppo 2000	
Predator Pct	Variable/Decrease	Barbour <i>et al.</i> 1999/ Gerritsen and Leppo 2000	WV also says decrease
Predator Taxa	Decrease	Gerritsen and Leppo 2000	
Shredder Pct	Decrease	Barbour <i>et al.</i> 1999	
Shredder Taxa	Decrease	Stribling <i>et al.</i> 2000	
Filter Pct	Variable/Increase	Barbour <i>et al.</i> 1999/Gerritsen and Leppo 2000	WV also says increase
Filter Taxa	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP (all # of taxa metrics decrease)
Clinger Taxa	Decrease	Barbour <i>et al.</i> 1999	
Clinger Pct	Decrease	Barbour <i>et al.</i> 1999	
Burrower Taxa	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP
Burrower Pct	UNKNOWN	UNKNOWN	
Climber Taxa	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP
Climber Pct	UNKNOWN	UNKNOWN	
Sprawler Taxa	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP
Sprawler Pct	UNKNOWN	UNKNOWN	
Swimmer Taxa	Decrease	Barbour <i>et al.</i> 1999	Inferred/RBP
Swimmer Pct	UNKNOWN	UNKNOWN	

To perform cost/benefit analyses, a stopwatch was used to time taxonomic resolution for twelve samples. Times recorded were standardized and averaged so that total time spent on identification at each taxonomic level and total time spent on mounting chironomid larvae within each subcoregion represented "costs". Costs versus "benefits," degree of information reflected by high discrimination efficiencies, were compared at each taxonomic level. The level of taxonomy exhibiting the greatest discriminatory efficiency between reference and impaired sites within the subcoregions was determined to be the most economical means for accurately classifying stream water quality.

RESULTS.

Taxonomic Resolution

Thirty-one biological samples from five reference sites and five or six impaired sites from three subcoregions were collected during the index period September through February of 2000, 2001 and 2002. Of the 6,782 macroinvertebrates identified 427 were identified to family level; 3,613 to genus level; 2,557 to species level, and 185 to subfamily, class or tribe (See Appendix B).

Metrics included within the subcoregional-specific invertebrate indices exhibited greater discrimination efficiency at different levels of taxonomic resolution (Table 2).

Metric discrimination efficiencies of the indices for the Southern Inner Piedmont, the Southern Metasedimentary Mountains, and the Sand Hills subcoregions were similar for the most part; however, within the index for the Southern Inner Piedmont (45a), burrower taxa had 0% discrimination efficiency at generic identification and 40% discrimination efficiency at both the family and lowest practical levels of identification. Discrimination efficiency for Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa metric was 20% greater at family identification than it was for both generic and LPL identifications and discrimination efficiency for percent tolerant taxa was 60% less than discrimination efficiencies for the same metric at the lowest practical and generic identification levels. Percent scraper had 20% greater discrimination efficiency at identification to LPL than it did to the genus and family identifications.

Table 2. Metric categories, metrics compiled into invertebrate indices (Hughes 2004) and metric discrimination efficiencies (DE's) for three levels of taxonomy for three subcoregions.

Southern Inner Piedmont		LPL	Genus	Family
Metric Category	Metric	D.E.	D.E.	D.E.
Richness	EPT Taxa	60%	60%	80%
Composition	Chironomidae Percent	100%	100%	100%
Composition	<i>Cricotopus</i> & <i>Chironomus</i> /TC	100%	100%	*
Tolerance	Tolerance Percent	100%	100%	40%
Trophic	Scraper Percent	80%	60%	60%
Habit	Burrower Taxa	40%	0%	40%
Sand Hills		LPL	Genus	Family
Metric Category	Metric	D.E.	D.E.	D.E.
Richness	Trichoptera Taxa	50%	50%	50%
Composition	Trichoptera Percent	50%	50%	50%
Composition	<i>Cricotopus</i> & <i>Chironomus</i> /TC	50%	50%	*
Tolerance	Tolerant Taxa	67%	67%	67%
Trophic	Scraper Percent	83%	0%	67%
Habit	Clinger Taxa	33%	33%	33%
Southern Metasedimentary Mountains		LPL	Genus	Family
Metric Category	Metric	D.E.	D.E.	D.E.
Richness	EPT Taxa	80%	80%	100%
Composition	Chironomidae Percent	80%	80%	80%
Composition	Percent <i>Tanypodinae</i> /TC	80%	*	*
Tolerance	Dominant Percent	80%	60%	100%
Tolerance	NCBI	60%	60%	*
Trophic	Scraper Taxa	100%	20%	100%
Habit	Burrower Taxa	60%	100%	60%

* Indicates metric was non-valid at this taxonomic level and was omitted from the index.

The index for the Sand Hills subcoregion (65c) had only one metric that varied in discrimination efficiency with taxonomic resolution: percent scraper. Percent scraper had 0% discrimination efficiency at genus identification but for identifications to LPL and family level, percent scraper had 83% and 67% discrimination efficiencies, respectively. Four metrics in the Southern Metasedimentary Mountains (66g) index had discrimination efficiencies that varied with taxonomic resolution. Family index EPT taxa had 100% discrimination efficiency, 20% greater discrimination efficiency than in the genus and LPL indices. The metric percent dominant taxa varied in discrimination efficiency from 100% at family identification to 60% at generic identification to 80% at LPL. Burrower taxa discriminated best at generic identification with 100% efficiency, a 40% increase in discrimination efficiency than exhibited in the familial and LPL indices. At generic identification, scraper taxa had discrimination efficiency of 20%, 80% less discrimination efficiency than family and LPL indices.

Overall index scores and discrimination efficiencies varied at each taxonomic level within each subcoregion. Discrimination efficiencies were 100% for both the lowest practical level and generic level indices within the Southern Inner Piedmont subcoregion; the family level index had discrimination efficiency of 80% (Table 3). The Sand Hills subcoregion had the greatest variation among the three subcoregions with discrimination efficiencies at the family level, generic level, and LPL of 50%, 83%, and 67%, respectively.

(Table 4); whereas the DE's for the Southern Metasedimentary Mountains subcoregion were 100% for the three indices (Tables 5).

Table 3. Stream index scores and index discrimination efficiencies (DE's) for the Southern Inner Piedmont.

Station ID	LPL Index	Genus Index	Family Index
45a-35	71	66	84
45a-50	23	41	27
45a-59	30	51	33
45a-61	22	36	42
45a-90	59	65	59
45a-03//	77	84	80
45a-3	66	79	63
45a-89	79	63	70
HH16	77	67	75
HH18	72	84	78
D.E.	100%	100%	80%

Note: Reference sites index scores (blue) and Impaired sites index scores (green).

Table 4. Stream index scores and index discrimination efficiencies (DE's) for the Sand Hills.

Station ID	LPL Index	Genus Index	Family Index
65c-12	58	65	47
65c-3	71	70	64
65c-4	17	15	26
65c-40	69	81	67
65c-8	55	71	66
65c-88	34	41	32
65c-80	69	76	59
65c-89	67	67	52
HH24	78	96	79
HH25	91	90	92
HH26	59	72	55
D.E.	67%	83%	50%

Table 5. Stream index scores and index discrimination efficiencies (DE's) for the Southern Metasedimentary Mountains.

Station ID	LPL Index	Genus Index	Family Index
66g-30	25	29	40
66g-31	35	45	55
66g-42	59	58	46
66g-44	37	27	24
66g-71	45	55	58
66g-2	63	57	56
66g-2-2	70	61	75
66g-23	83	87	87
66g-5	83	74	81
66g-6	74	80	80
D.E.	100%	100%	100%

Taxonomic resolution for assessing bioassessment sensitivity was depicted using box and whisker plots. Box and whisker plots display the statistics of a population of sites, including the median value, minimum and maximum values, and the 25th and 75th percentiles (Figures 2-4).

Identifications to LPL in the Southern Inner Piedmont, to generic level in the Sand Hills, and to familial level in the Southern Metasedimentary Mountains showed the greatest discriminatory efficiency for classifying reference and impaired sites.

Figure 2. Southern Inner Piedmont box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.

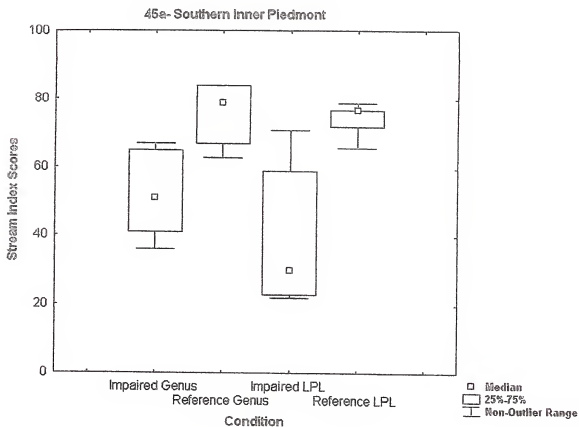
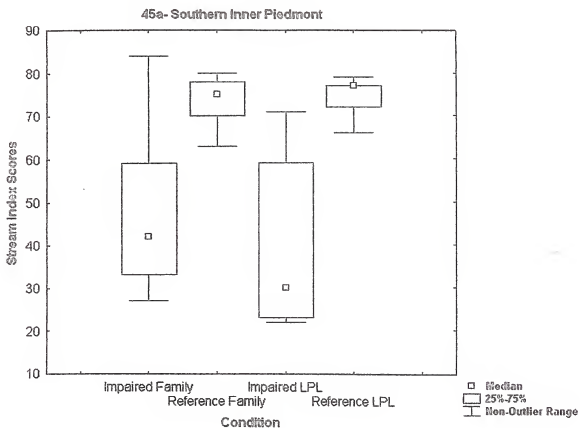


Figure 3. Sand Hills box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.

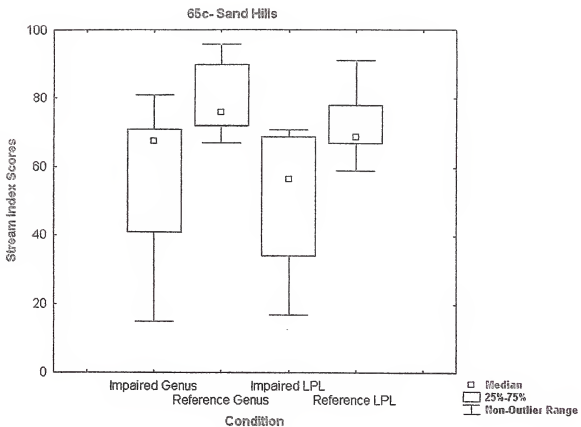
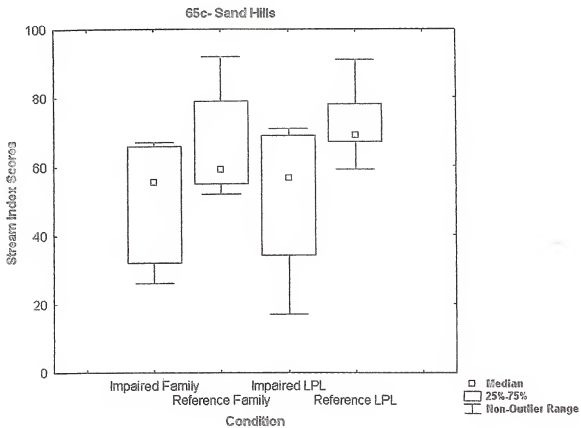
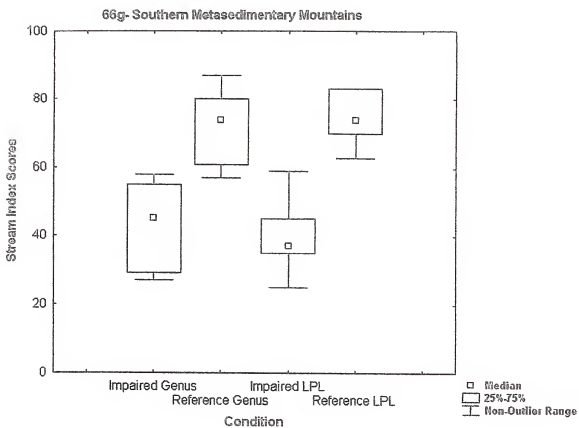
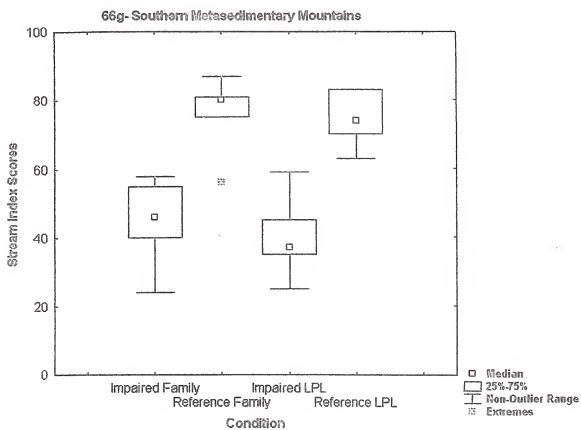


Figure 4. Southern Metasedimentary Mountains box and whisker plots exhibiting the distribution of reference condition and impaired index scores for both the family and genus indices as compared to lowest practical level (LPL) score distributions.



Time

For 12 impaired sites, approximately forty-one hours were spent mounting chironomid larvae while identification for all macroinvertebrates including the chironomid larvae to LPL took approximately thirty-two hours and forty-five minutes. Time spent on each level of identification for all taxonomic orders, averaged one-half hour for familial level, one hour and forty-five minutes for generic level, and one-half hour for specific level. Average time spent on identification is the cumulative total of time spent on identification for each taxonomic level, in this case two hours and forty-five minutes. However, required mounting time must be included with the identification time to reflect the true costs of identification. By combining cumulative average identification time (two hours and forty-five minutes) with average mounting time (three hours and thirty minutes), cumulative time (costs) spent on identification for all three levels, per sample, averaged six hours and twenty-five minutes (Table 6).

Table 6. Mounting time and identification (ID) time for twelve samples.

Taxonomic Level	ID Time (hrs)	Mount Time (hrs)	Average ID Time (hrs)	Average Mount Time (hrs)	Average Total ID Time (hrs)
Family	~ 4.50	0	~0.50	0	~0.50
Genus	~21.00	~41.0	~1.75*	~3.50	~5.25
Species	~ 7.50	0	~0.50*	0	~0.50
Total (LPL)	~32.75	~41.0	~2.75*	~3.50	~6.25

Note: Time includes only successful attempts of identification to lower taxonomic levels. It does not account for time spent pursuing lower taxonomic levels that proved unsuccessful.

Identification times and mounting times per subcoregion are shown in Tables 7-9. Total time spent for LPL identification was approximately eight and one-half hours, fifteen and one-half hours, and nine hours for the Southern Inner Piedmont, Sand Hills and Southern Metasedimentary Mountains subcoregions, respectively. The Sand Hills subcoregion required more time than the other two subcoregions for mounting due to the large number of Chironomidae in the samples. Approximately eighteen hours and forty-five minutes were spent mounting chironomid larvae for the Sand Hills, whereas, approximately thirteen hours and fifteen minutes were spent on mounting for the Southern Inner Piedmont. The Southern Metasedimentary Mountains subcoregion required about nine hours and twenty-five minutes for mounting purposes. When identification times and mounting times are combined, average total time spent on taxonomy was approximately five hours and fifteen minutes per sample for the Southern Inner Piedmont subcoregion, eight hours and forty-five minutes per sample for the Sand Hills subcoregion and four hours and thirty minutes per sample for the Southern Metasedimentary Mountains subcoregion.

Table 7. Southern Inner Piedmont identification (ID) and mounting times

Taxonomic Level	ID Time (hrs)	Mount Time (hrs)	Average ID Time (hrs)	Average Mount Time (hrs)	Average Total ID Time (hrs)
Family	~ 1.00	0	~0.25	0	~0.25
Genus	~ 5.00	~13.25	~1.25*	~3.25	~4.50
Species	~ 2.75	0	~0.50*	0	~0.50
Total (LPL)	~8.50	~13.25	~2.00*	~3.25	~5.25

Table 8. Sand Hills identification (ID) and mounting times

Taxonomic Level	ID Time (hrs)	Mount Time (hrs)	Average ID Time (hrs)	Average Mount Time (hrs)	Average Total ID Time (hrs)
Family	~ 2.00	0	~0.50	0	~0.50
Genus	~10.75	~18.75	~2.75*	~4.75	~7.50
Species	~ 2.75	0	~0.75*	0	~0.75
Total (LPL)	~15.50	~18.75	~4.00*	~4.75	~8.75

Table 9. Southern Metasedimentary Mountains identification (ID) and mounting times

Taxonomic Level	ID Time (hrs)	Mount Time (hrs)	Average ID Time (hrs)	Average Mount Time (hrs)	Average Total ID Time (hrs)
Family	~1.50	0	~0.50	0	~0.50
Genus	~5.50	~5.50	~1.25*	~2.25	~3.50
Species	~2.25	0	~0.50*	0	~0.50
Total (LPL)	~9.00	~9.25	~2.25*	~2.25	~4.50

* Time includes only successful attempts of identification to lower taxonomic levels.

DISCUSSION.

Taxonomic Resolution Analysis

Subcoregion-specific indices for the Southern Upper Piedmont, the Sand Hills, and the Southern Metasedimentary Mountains were evaluated at the family level, genus level and LPL for taxonomic resolution. Analysis, based on discriminatory ability of the indices and depictions of score distributions indicated that taxonomic resolution requirements varied among subcoregions in Georgia.

Southern Metasedimentary Mountains

The invertebrate index for the Southern Metasedimentary Mountains (66g) had discrimination efficiency of 100% when metric scores for the three levels of identification were computed. When index score distributions for LPL, genus level, and family level identifications were compared LPL index scores exhibited slightly greater discrimination potential than familial index scores due to the slightly greater degree of separation between interquartile ranges of reference condition and impaired index scores. Although the family index exhibited a smaller degree of separation between interquartile ranges, the variance among reference condition scores was less than reference condition scores in the LPL index and 100% of reference condition index scores were above the 25th percentile threshold. One outlier (outliers may indicate natural variability; misclassification of stream conditions *a priori*, or an under-represented site class)(Jessup and Gerritsen 2000) was depicted in the family index but removing it from the index did not affect discrimination efficiency. Although the generic

index had 100% discrimination efficiency, the degree of separation between the interquartile ranges was not as great as the other two indices. In fact, the slight overlap of whiskers indicates the chance of making a Type I and/or Type II error when identifications to the generic level are considered. Therefore, identification to either LPL or family level is adequate for stream health classification for this subecoregion.

Southern Inner Piedmont

Identification to LPL is recommended for the Southern Inner Piedmont subecoregion. Discrimination efficiencies for the invertebrate index were 80% at family level, 100% at genus level and 100% at LPL. The greatest degree of overlap between reference condition and impaired index scores occurred when identification to family level was considered. In fact, some impaired index scores (whisker) overlapped the entire suite of reference condition index scores indicating a 20% chance of misclassifying stream health. Although some overlap between reference condition and impaired index scores occurred at both the generic and lowest practical identification levels, the LPL index exhibited the greatest degree of separation between interquartile ranges, indicating LPL identification discriminates between reference condition and impaired sites more efficiently than identification to generic level. There was whisker overlap in the LPL index, but all impaired index scores fell below the 25th percentile threshold.

Sand Hills

Greatest discrimination between reference condition and impaired index scores for the Sand Hills subcoregion occurred when identification was considered at the generic level. Discrimination efficiencies for the Sand Hill's invertebrate index were 50% at family level, 83% at genus level and 67% at LPL. Overall, the genus index exhibited the least degree of overlap and complete separation of interquartile ranges whereas both LPL and family indices exhibited some degree of overlap of both whiskers and interquartile ranges. There is a 33% chance of error when LPL index is used for classifying stream health; whereas, the chance of error is much less (17%) when the genus index is used. Therefore, identification to generic level is recommended for the Sand Hills subcoregion.

Taxonomic Resolution Requirements

Southern Metasedimentary Mountains

Identification to either LPL or familial level is adequate for the Southern Metasedimentary Mountains region, an area of open low hills, with some rugged, isolated mountains such as the Cohutta Mountains and Fort Mountain. Due to the steepness of terrain, anthropogenic activity is somewhat limited within this region. Because anthropogenic activity is limited, stress imposed on aquatic ecosystems may not be as great as it is in the Sand Hills and the Southern Inner

Piedmont regions, easily inhabited regions of rolling hills and plains and may elucidate why family level identification is sufficient.

Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa are known to exist in relatively pristine areas, and historically they have been used as indicators of good stream health. EPT responses to various stressors have been well documented, and pollution tolerance values have long been established.

EPT taxa and Diptera taxa, particularly Chironomidae, were commonly collected in both reference condition and impaired streams within the Southern Metasedimentary Mountains region. Individual metric discrimination efficiency for the three levels of identification was greatest at family level for both the EPT taxa metric and percent dominant metric; whereas, the metric percent Chironomidae remained constant. Therefore, the increase in index performance at family level can be attributed to the presence and abundance of EPT taxa and the lack of community diversity (Table 10).

These findings are similar to research conducted by Hawkins *et al.* (2000). They found that identification to family level was sufficient in areas of limited taxonomic diversity. Among the three subcoregions studied, the Southern Metasedimentary Mountains scored the lowest (0.556) for biotic diversity, further supporting my recommendation that family level identification is sufficient for this subcoregion.

Table 10. Stream diversity values for Southern Inner Piedmont, Sand Hills, and Southern Metasedimentary Mountains

Southern Inner Piedmont		
StationID	Reference	Simpson D
45a-35	No	0.022
45a-50	No	0.064
45a-59	No	0.159
45a-61	No	0.046
45a-90	No	0.104
45a03//	Yes	0.101
45a-3	Yes	0.110
45a-89	Yes	0.143
HH16	Yes	0.063
HH18	Yes	0.123
Sum Of Diversity Values (45a)		0.935
Sand Hills		
StationID	Reference	Simpson D
65c-12	No	0.071
65c-3	No	0.143
65c-4	No	0.049
65c-40	No	0.105
65c-8	No	0.086
65c-88	No	0.039
65c-80	Yes	0.074
65c-89	Yes	0.111
HH24	Yes	0.054
HH25	Yes	0.074
HH26	Yes	0.068
Sum Of Diversity Values (65c)		0.875
Southern Metasedimentary Mountains		
StationID	Reference	Simpson D
66g-30	No	0.093
66g-31	No	0.111
66g-42	No	0.035
66g-44	No	0.070
66g-71	No	0.053
66g-2	Yes	0.074
66g-2-2	Yes	0.038
66g-23	Yes	0.026
66g-5	Yes	0.034
66g-6	Yes	0.022
Sum Of Diversity Values (66g)		0.556

Sand Hills

Identification to generic level is required for the Sand Hills. Metric discrimination efficiencies were similar for all three levels of identification except for the percent scraper metric, which decreased from 83% to 0% when identification data for LPL was reduced to generic level. Yet, even with this loss of information, the genus index discrimination potential was greater than the LPL index. The reduction in information at the generic level for percent scraper may represent ecological noise as suggested by Bailey *et al.* (2001). Also, greater variation in species among the sites may be obfuscating the discriminating potential of the LPL index.

Southern Inner Piedmont

Biotic diversity was highest for this subcoregion (0.935), which might explain identification requirements to LPL. As Resh and Unzicker (1975) reported, established water quality tolerance values for 61 species of the 89 genera fall into different tolerance categories indicating that identification to LPL is necessary to explain the variation among species and their different responses to various stressors. Information gained from the *Cricotopus/Chironomus/Total Chironomidae* metric for both the LPL and genus indices was lost when identification to family was considered, and this metric was not effective at lower taxonomic levels. However, metrics describing organisms' trophic and behavioral

habit (percent scraper and burrower taxa) provided adequate information for discrimination at LPL identification.

Cost Benefit Analysis

As stipulated in the protocol, all organisms were identified to LPL. This level of identification entails a fair amount of investment in time and in money, but identification to LPL is needed before taxonomic resolution analysis can be performed, and it is possible taxonomic resolution to LPL may be the only level of identification that adequately discriminates between reference condition streams and impaired streams. Once taxonomic resolution requirements have been predetermined, cost/benefit analyses can be used to examine not only the real costs of taxonomic work but also the potential savings that would be realized when future benthic work is needed for assessment and monitoring programs.

Southern Inner Piedmont

Average costs incurred, per sample, for taxonomic work in the Southern Inner Piedmont (45a) were \$5.00 for familial identification plus, \$12.50 for generic identification and an additional \$2.50 for identification to species. Costs incurred for identification of organisms from family level to genus level increased an average of \$7.50. Time needed to mount Chironomidae, however, must be included in total costs at taxonomic levels below familial level as chironomid larvae should be clear-mounted to improve identification accuracy. When

mounting time is included with identification time, generic level identification costs averaged \$47.50, an increase of \$35.00 per sample. Identification of organisms to LPL incurred costs of \$55.00 per sample. When total costs for each taxonomic level are compared, family identification, with a minimal average cost of \$5.00 is the most economical level of identification. However, based on the discrimination efficiency value and distribution of index scores, family level index for Southern Inner Piedmont does not discriminate between reference condition and impaired sites in fact, taxonomic resolution to LPL has the greatest discriminatory ability so saving time and money on future taxonomic work in this subecoregion is not feasible.

**Cost/Benefit Analysis Per Sample
Southern Inner Piedmont Subecoregion (45a)**

Family Level Costs:

Average time spent on identification (.50 hrs X \$10/hr)	\$ 5.00
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Genus Level Costs:

Average time spent on identification (1.25 hrs X \$10/hr)	\$12.50
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Species Level Costs:

Average time spent on identification (.25 hrs. X \$10/hr)	\$ 2.50
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Combined Level Identification Costs:

Average time spent on identification (2.00 hrs. X \$10/hr)	\$20.00
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Mounting Costs:

Average time spent mounting Chironomidae (3.50 hrs. X \$10/hr)	\$35.00
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Total Costs Per Sample	\$55.00
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Sand Hills

Average identification costs incurred at the familial level for the Sand Hills (65c) was \$7.50. Average identification costs of \$27.50 and average mounting costs of \$47.50 were incurred at the generic level; and totaled \$82.50 per sample when family level costs are included. Average costs for species identification was \$5.00. Identification of organisms to LPL incurred cumulative average costs of \$87.50 per sample when species level identification costs were added to generic and familial level costs. Because the best discriminating index for the Sand Hills is the genus index, costs for future benthic work in this subcoregion would decrease. On average, future savings of \$5.00 per sample would be realized.

Southern Metasedimentary Mountains

Identification costs for familial level for the Southern Metasedimentary Mountains (66g) averaged \$5.00. Generic identification costs totaled \$35.00. Sixty four percent of the generic costs resulted from the two and one quarter hours needed for mounting Chironomidae. Average costs for species identifications were \$5.00 with average costs for identifications to LPL totaling \$45.00 per sample. Although both the LPL index and the family index for this subcoregion provided sufficient information for accurately classifying stream health, in terms of saving time and money, identifications to family, for future benthic work, is sufficient. Because chironomid larvae do not need to be

mounted for family identification, \$40.00 per sample on average would be saved as future identification costs would be about \$5.00 per sample.

**Cost/Benefit Analysis Per Sample
Sand Hills Subcoregion (65c)**

Family Level Costs:

Average time spent on identification (.75 hrs. X \$10/hr) \$ 7.50

Genus Level Costs:

Average time spent on identification (2.75 hrs. X \$10/hr) \$27.50

Species Level Costs:

Average time spent on identification (.50 hrs. X \$10/hr) \$ 5.00

Combined Level Identification Costs:

Average time spent on identification (4.00 hrs. X \$10/hr) \$40.00

Mounting Costs:

Average time spent mounting Chironomidae (4.75 hrs. X \$10/hr) \$47.50

Total Costs Per Sample **\$87.50**

Less Total Costs Per Sample (Genus Level) (\$27.50 + \$47.50 + \$7.50) **\$82.50**

Future Net Savings Per Sample **\$ 5.00**

Note: An average of 5.7% of total costs is saved when future taxonomic work is needed for the Sand Hills.

Cost/Benefit Analysis Per Sample	
Southern Metasedimentary Mountains Subcoregion (66g)	
Family Level Costs:	
Average time spent on identification (.50 hrs. X \$10/hr)	\$ 5.00
Genus Level Costs:	
Average time spent on identification (1.25 hrs. X \$10/hr)	\$12.50
Species Level Costs:	
<u>Average time spent on identification (.50 hrs. X \$10/hr)</u>	<u>\$ 5.00</u>
Combined Level Identification Costs:	
Average time spent on identification (2.25 hrs. X \$10/hr)	\$22.50
Mounting Costs:	
<u>Average time spent mounting Chironomidae (2.25 hrs. X \$10/hr)</u>	<u>\$22.50</u>
Total Costs Per Sample	\$45.00
Less Total Costs Per Sample (Family Level)	<u>\$ 5.00</u>
Future Net Savings Per Sample	\$40.00

Note: An average of 88.9% of total costs is saved when future taxonomic work is needed for the Southern Metasedimentary Mountains.

CONCLUSIONS.

Taxonomic resolution requirements vary among subecoregions in Georgia. However, additional analysis is necessary to conclude whether or not taxonomic resolution requirements vary within all of Georgia's six ecoregions.

The recommended identification levels: LPL for the Southern Inner Piedmont, generic level for the Sand Hills, and familial level for the Southern Metasedimentary Mountains should be implemented before additional assessment or monitoring takes place if costs are to be minimized as the risks of misclassifying stream health can be costly. If classification results in Type-I errors and healthy streams (reference condition) are classified, as impaired, additional time and money will be spent on unnecessary assessments. If classification results in Type-II errors and impaired streams are classified as healthy, costs become even greater because stream health deterioration is compounded over time, which means more assessments and frequent monitoring is necessary, and there is also the possibility that Total Maximum Daily Loads (TMDL's) may be imposed on the streams to control non-point sources of pollution as stipulated in §303(d) of the Clean Water Act (J. Gore, Department of Environmental Science, Columbus University, personal communication). Furthermore, the Environmental Protection Agency (EPA) could issue fines up to \$25,000/per day for any stream not in compliance (Clean Water Act, §305(b)(1)(B), 33 U.S.C., §1315(b)(1)(B) 1999).

Therefore, by predetermining taxonomic resolution requirements and by performing cost/benefit analyses, agencies involved in assessment and monitoring programs would not only minimize risks of misclassifying stream health, they could also identify regions that may require less taxonomic effort, which can lead to savings in terms of time and money.

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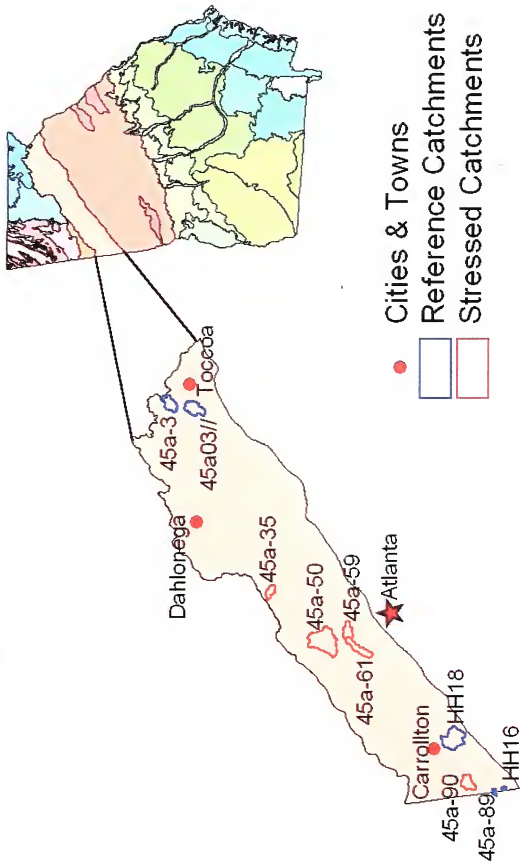
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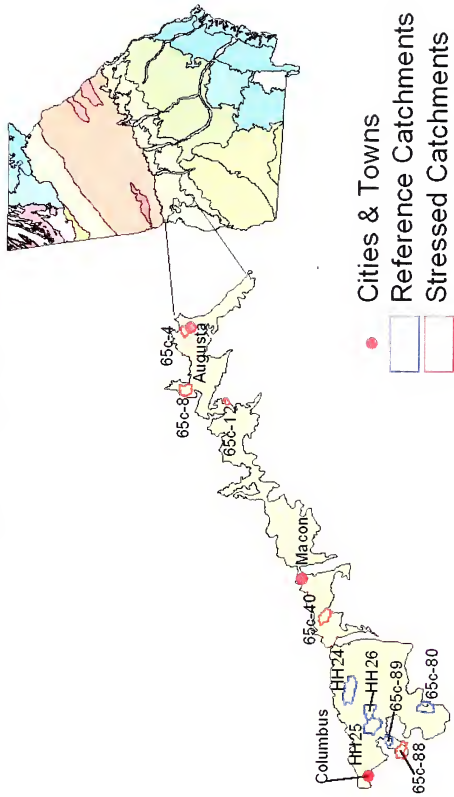
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APPENDIX A – MAPS

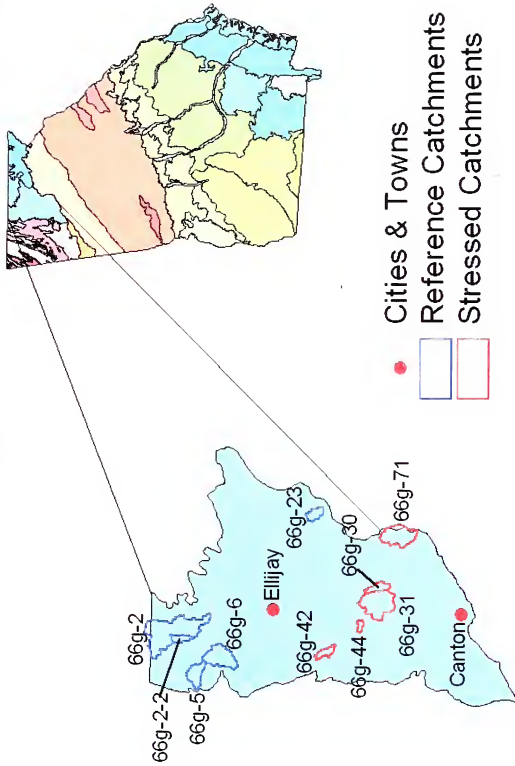
45a - Southern Inner Piedmont



65c - Sand Hills



66g - Southern Metasedimentary Mountains



APPENDIX B – TAXA LISTS AND TAXA REFERENCES

Sub-region / Station ID	Ref.	Order	Family	Final Identification	Individuals			
Middle Fork Broad River								
45a03//	Yes	Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	1			
				<i>Microcyloepus pusillus</i>	1			
				<i>Promoresia elegans</i>	1			
				<i>Stenelmis</i> sp.	2			
			Gyrinidae	<i>Dineutus</i> sp.	1			
			Diptera	Ceratopogonidae	<i>Bezzia</i> complex	2		
					Chironomidae	<i>Ablabesmyia annulata</i>	10	
						<i>Ablabesmyia mallochii</i>	2	
						<i>Ablabesmyia rhamph</i> grp.	1	
						<i>Apedilum</i> sp.	4	
						<i>Brillia flavifrons</i>	1	
						<i>Clinotanytus</i> sp.	1	
						<i>Cryptochironomus</i> sp.	1	
						<i>Endotribelos hesperium</i>	1	
						<i>Hydrobaenus</i> sp.	1	
						<i>Microtendipes</i> sp.	1	
						Orthocladiinae	1	
						<i>Parakiefferiella A</i>	1	
						<i>Paratanytarsus</i> sp.	2	
						<i>Phaenopsectra</i> sp.	15	
						<i>Phaenopsectra obediens</i> grp.	66	
						<i>Polypedilum aviceps</i>	2	
						<i>Polypedilum halterale</i>	1	
						<i>Psectrocladius elatus</i>	1	
						<i>Rheotanytarsus</i> sp.	4	
						<i>Robackia demejerei</i>	1	
						<i>Stenochironomus</i> sp.	6	
						<i>Stictochironomus</i> sp.	1	
						Tanypodinae	1	
						<i>Tribelos</i> sp.	1	
						<i>Tribelos jucundus</i>	5	
						<i>Xestochironomus</i>	1	
						Simuliidae	<i>Simulium</i> sp.	1
						Ephemeroptera		Baetiscidae
		<i>Baetisca gibbera</i>	1					
					Heptageniidae	<i>Stenonema</i> sp.	17	
					Isonychiidae	<i>Isonychia</i> sp.	1	
					Potamanthidae	<i>Potamanthus distinctus</i>	5	
		Megaloptera		Corydalidae	<i>Corydalus cornutus</i>	1		
					<i>Nigronia serricomis</i>	2		
		Sialidae	<i>Sialis</i> sp.	1				
			Odonata	Aeshnidae	<i>Aeshna umbrosa</i>	1		
			Aeshnidae	<i>Aeshna</i> sp.	1			

		Coenagrionidae	Coenagrionidae	2
		Gomphidae	Gomphidae	1
			<i>Gomphus borealis</i>	1
			<i>Lanthus vernalis</i>	1
	Plecoptera	Perlidae	<i>Perlesta placida</i>	3
			Perlidae	1
		Perlodidae	<i>Yugus bulbosus</i>	1
		Taeniopterygidae	<i>Strophopteryx</i> sp.	5
	Trichoptera	Brachycentridae	Brachycentridae	2
		Calamoceratidae	<i>Anisocentropus pyraloides</i>	1
		Hydropsychidae	<i>Cheumatopsyche</i> sp.	13
	<i>Hydropsyche</i> sp.		1	
	Trichoptera	Hydropsychidae	Hydropsychidae	8
			<i>Potamyia flava</i>	5
			Leptoceridae	<i>Nectopsyche</i> sp.
			<i>Setodes</i> sp.	1
		Polycentropodidae	<i>Polycentropus</i> sp.	1
	Veneroida	Pisidiidae	<i>Sphaerium</i> sp.	1
	Class: Clitellata		Oligochaeta	7

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Davidson Creek					
45a-3	Yes	Diptera	Chironomidae	<i>Ablabesmyia</i> sp.	1
				<i>Ablabesmyia mallochi</i>	1
				<i>Apedilum</i> sp.	2
				Chironomidae	3
				<i>Corynoneura B</i>	4
				<i>Larsia</i> sp.	2
				Orthoclaadiinae	7
				<i>Parakiefferiella</i> sp.	1
				<i>Parametrioctenemus</i> sp.	2
				<i>Paratanytarsus</i> sp.	3
				<i>Phaenopsectra</i> sp.	1
				<i>Polypedilum aviceps</i>	3
				<i>Polypedilum flavum</i>	6
				<i>Polypedilum fallax</i>	1
				<i>Rheocricotopus</i> sp.	1
				<i>Rheotanytarsus</i> sp.	1
				<i>Thienemanniella</i> sp.	14
				<i>Thienemanniella xena</i>	6
				Simuliidae	<i>Simulium</i> sp.
			Tipulidae	<i>Pseudolimnophila</i> sp.	1
			<i>Tipula</i> sp.	1	
		Ephemeroptera	Ephemeridae	<i>Hexagenia</i> sp.	1
			Heptageniidae	Heptageniidae	1
				<i>Stenonema</i> sp.	4
			Isonychiidae	<i>Isonychia</i> sp.	5
		Megaloptera	Corydalidae	<i>Corydalus comutus</i>	1
				<i>Nigronia serricornis</i>	1
		Neotaenioglossa	Pleuroceridae	<i>Pleurocera</i> sp.	1
		Plecoptera	Perlidae	<i>Acroneuria abnormis</i>	17
				<i>Acroneuria internata</i>	3
				Perlidae	2
			Perlodidae	<i>Helopicus subvarians</i>	1
			Taeniopterygidae	<i>Strophopteryx fasciata</i>	1
		<i>Strophopteryx limata</i>	55		
Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	23		
		<i>Hydropsyche</i> sp.	2		
	Philopotamidae	<i>Chimarra</i> sp.	12		
Class: Clitellata				Oligochaeta	2

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals		
Smithwick Creek							
45a-35	No	Basommatophora Coleoptera	Lymnaeidae	Lymnaeidae	1		
			Dryopidae	<i>Helichus lithophilus</i>	1		
			Dytiscidae	<i>Celina</i> sp.	1		
			Elmidae	<i>Ancyronyx variegatus</i>	2		
				<i>Dubiraphia</i> sp.	2		
				<i>Macronychus glabratus</i>	1		
				<i>Microcylloepus pusillus</i>	2		
				<i>Optioservus</i> sp.	4		
				<i>Optioservus ovalis</i>	1		
			Psephenidae	<i>Psephenus herricki</i>	1		
			Decapoda	Cambaridae	<i>Procambarus</i> sp.	1	
			Diptera	Chironomidae	Ceratopogonidae	<i>Bezzia</i> complex	1
					Ablabesmyia sp.	1	
					<i>Ablabesmyia mallochi</i>	2	
		<i>Brillia</i> sp.			3		
		<i>Brillia flavifrons</i>			2		
		<i>Chironomus</i> sp.			8		
		<i>Corynoneura</i> sp.			1		
		<i>Cricotopus bicinctus</i>			7		
		<i>Cryptochironomus</i> sp.			4		
		<i>Microtendipes pedellus</i> grp.			3		
		<i>Odontomesa fulva</i>			1		
		<i>Orthocladius</i> sp.			2		
		<i>Orthocladius obumbratus</i>			4		
		<i>Paracladopelma</i> sp.			1		
		<i>Parakiefferiella E</i>			1		
		<i>Paralauterborniella nigrohalterale</i>			1		
		<i>Parametriocnemus</i> sp.			6		
		<i>Paratendipes albimanus</i>			1		
		<i>Phaenopsectra obediens</i> grp.			4		
		<i>Phaenopsectra punctipes</i> grp.			1		
		<i>Phaenopsectra/Tribelos</i> complex			6		
		<i>Polypedilum A</i>			2		
		<i>Polypedilum aviceps</i>			1		
		<i>Polypedilum scalaenum</i>			2		
		<i>Polypedilum tritum</i>			1		
		<i>Potthastia longimana</i>			2		
		<i>Procladius (Holotanypus)</i> sp.			2		
		<i>Pseudochironomus</i> sp.	1				
		<i>Rheotanytarsus</i> sp.	1				
		<i>Rheotanytarsus exiguus</i> group	1				
<i>Rheotanytarsus pellucidus</i>	6						

			<i>Stempellinella/Zavrelia</i> complex	1
			<i>Stenochironomus</i> sp.	1
			<i>Tanytarsus</i> sp.	2
			<i>Tanytarsus A</i>	3
			<i>Tanytarsus C</i>	1
			<i>Tanytarsus G</i>	2
			<i>Tanytarsus J</i>	1
			<i>Tanytarsus M</i>	2
			<i>Tanytarsus Q</i>	2
			<i>Thienemanniella</i> sp.	1
			<i>Thienemanniella B</i>	2
			<i>Thienemannimyia</i> group sp.	15
			<i>Tribelos</i> sp.	3
			<i>Tribelos fuscicome</i>	1
			<i>Tribelos jucundus</i>	7
			<i>Zavrelimyia thryptica</i>	1
		Empididae	<i>Hemerodromia</i> sp.	5
		Tipulidae	<i>Antocha</i> sp.	4
			<i>Tipula</i> sp.	1
			Tipulidae	1
	Ephemeroptera	Ephemerellidae	<i>Ephemerella argo</i>	1
			Ephemerellidae	11
			<i>Serratella deficiens</i>	3
		Ephemeridae	<i>Hexagenia limbata</i>	5
		Heptageniidae	Heptageniidae	2
			<i>Stenonema</i> sp.	10
			<i>Stenonema modestum</i>	20
		Leptophlebiidae	Leptophlebiidae	1
		Siphonuridae	Siphonuridae	4
	Odonata	Coenagrionidae	<i>Argia</i> sp.	2
		Gomphidae	<i>Progomphus obscurus</i>	1
	Plecoptera	Capniidae	Capniidae	7
		Nemouridae	Nemouridae	1
		Perlidae	Perlidae	1
		Perlodidae	<i>Isoperla marlynia</i>	1
			Perlodidae	3
		Taeniopterygidae	<i>Oemopteryx</i> complex	1
	Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	5
			<i>Hydropsyche betteni/depravata</i> complex	3
			Hydropsychidae	1
		Limnephilidae	<i>Hydatophylax argus</i>	1
		Philopotamidae	<i>Chimarra</i> sp.	1
		Psychomyiidae	<i>Lype diversa</i>	1
		Class: Clitellata	Oligochaeta	2

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Noonday Creek					
45a-50	No	Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	2
		Diptera	Chironomidae	<i>Ablabesmyia mallochi</i>	2
				<i>Brillia flavifrons</i>	1
				<i>Chironomus</i> sp.	6
				<i>Corynoneura</i> sp.	17
				<i>Corynoneura</i> B	1
				<i>Cricotopus bicinctus</i>	33
				<i>Cricotopus sylvestris</i> group	5
				<i>Cricotopus/Orthocladius</i> complex	1
				<i>Eukiefferiella brehmi</i> group	2
				<i>Labrundinia pilosella</i>	1
				<i>Micropsectra</i> D	1
				<i>Orthocladus</i> sp.	2
				<i>Orthocladus dentifer</i>	1
				<i>Parakiefferiella</i> B	2
				<i>Parametrocnemus</i> sp.	1
				<i>Paratrichocladus</i> sp.	1
				<i>Phaenopsectra obediens</i> grp.	1
				<i>Phaenopsectra punctipes</i> grp.	2
				<i>Phaenopsectra/Tribelos</i> complex	3
				<i>Polypeditum flavum</i>	3
				<i>Polypeditum scalaenum</i>	1
				<i>Potthastia longimana</i>	4
				<i>Rheocricotopus robacki</i>	6
				<i>Rheotanytarsus exiguus</i> group	2
				<i>Rheotanytarsus pellucidus</i>	12
				<i>Tanytarsus</i> sp.	1
				<i>Tanytarsus</i> C	1
				<i>Tanytarsus</i> L	1
				<i>Tanytarsus</i> U	11
				<i>Thienemanniella</i> sp.	3
				<i>Thienemanniella xena</i>	10
				<i>Thienemannimyia</i> group sp.	9
		<i>Tribelos</i> sp.	1		
		<i>Tribelos jucundus</i>	2		
		Empididae	<i>Hemerodromia</i> sp.	13	
		Ephemeroptera	Baetidae	Baetidae	4
			Heptageniidae	Heptageniidae	1
		Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	25
				<i>Hydropsyche</i> sp.	2
				Hydropsychidae	6
Class: Clitellata				Oligochaeta	2

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Rottenwood Creek					
45a-59	No	Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	1
		Decapoda	Cambaridae	<i>Procambarus spiculifer</i>	6
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	1
				<i>Dasyhelea</i> sp.	1
		Chironomidae	<i>Ablabesmyia mallochi</i>	5	
			<i>Chironomus</i> sp.	5	
			<i>Cricotopus politus</i>	10	
			<i>Dicrotendipes</i> sp.	1	
			<i>Endochironomus nymphoides</i> group	1	
			<i>Endotribelos hesperium</i>	1	
			<i>Larsia</i> sp.	1	
			<i>Nanocladius</i> sp.	5	
			<i>Parametriochnemus</i> sp.	1	
			<i>Paratanytarsus dissimilis</i>	1	
			<i>Phaenopsectra obediens</i> grp.	5	
			<i>Phaenopsectra/Tribelos</i> complex	1	
			<i>Polypedilum A</i>	1	
			<i>Polypedilum fallax</i>	1	
			<i>Polypedilum flavum</i>	2	
			<i>Polypedilum halterale</i>	13	
			<i>Polypedilum illinoense</i>	1	
			<i>Rheocricotopus robacki</i>	2	
			<i>Rheosmittia arcuata</i>	71	
			<i>Rheotanytarsus A</i>	1	
			<i>Rheotanytarsus pellucidus</i>	1	
			<i>Saetheria tylus</i>	3	
			<i>Stenochironomus</i> sp.	1	
			Tanypodinae	1	
			<i>Tanytarsus</i> sp.	1	
			<i>Thienemanniella</i> sp.	2	
			<i>Thienemanniella xena</i>	2	
			<i>Thienemannimyia</i> group sp.	8	
<i>Tribelos jucundus</i>	1				
<i>Trissopelopia ogemawi</i>	1				
<i>Zavrelimyia thryptica</i>	3				
Simuliidae	Simuliidae	1			
	<i>Simulium</i> sp.	4			
Tipulidae	<i>Pedicia</i> sp.	3			
	<i>Pilana</i> sp.	1			
Heteroptera	Veliidae	<i>Rhagovelia</i> sp.	1		
Odonata	Calopterygidae	<i>Calopteryx</i> sp.	1		
	Coenagrionidae	<i>Argia</i> sp.	4		
Trichoptera	Hydropsychidae	Hydropsychidae	1		
Class: Clitellata				Oligochaeta	8

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Olley Creek					
45a-61	No	Amphipoda	Gammaridae	<i>Gammarus</i> sp.	1
			Talitridae	<i>Hyalella azteca</i>	8
		Basommatophora	Physidae	<i>Physella</i> sp.	2
			Planorbidae		1
		Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	8
				<i>Dubiraphia vittata</i>	1
				<i>Microcyloepus pusillus</i>	1
			Gyrinidae	<i>Dineutus</i> sp.	3
				<i>Dineutus robertsi</i>	2
		Decapoda	Cambaridae	<i>Procambarus spiculifer</i>	2
		Diptera	Chaoboridae	<i>Chaoborus</i> sp.	2
			Chironomidae	<i>Ablabesmyia</i> sp.	2
				<i>Ablabesmyia mallochi</i>	6
				<i>Chironomus</i> sp.	37
				<i>Corynoneura</i> sp.	1
				<i>Cricotopus annulator</i> complex	1
				<i>Cricotopus bicinctus</i>	14
				<i>Cryptochironomus</i> sp.	2
				<i>Dicrotendipes</i> sp.	4
				<i>Dicrotendipes nervosus</i>	1
				<i>Labrundinia pilosella</i>	2
				<i>Nanocladius</i> sp.	1
				<i>Orthocladius carlatus</i>	1
				<i>Orthocladius oliveri</i>	2
				<i>Parakiefferella B</i>	1
				<i>Paratanytarsus</i> sp.	7
				<i>Paratanytarsus dissimilis</i>	1
				<i>Paratendipes albianus</i>	4
				<i>Phaenopsectra obediens</i> gr.	3
				<i>Phaenopsectra punctipes</i> gr.	3
				<i>Phaenopsectra/Tribelos</i> complex	13
				<i>Polypedilum fallax</i>	2
<i>Polypedilum scalaenum</i>	1				
<i>Potthastia longimana</i>	2				
<i>Procladius</i> sp.	2				
<i>Psectrocladius simulans</i>	1				
<i>Reomyia</i> sp.	1				
<i>Rheotanytarsus</i> sp.	1				
<i>Rheotanytarsus exiguus</i> group	1				
<i>Rheotanytarsus pellucidus</i>	1				
<i>Stenochironomus</i> sp.	2				
<i>Tanytarsus</i> sp.	9				
<i>Thienemannimyia</i> group sp.	8				

			<i>Tribelos jucundus</i>	6
			<i>Dixella indiana</i>	3
	Ephemeroptera	Dixidae	<i>Baetisca obesa</i>	1
		Baetiscidae	<i>Eurylophella bicolor</i>	1
		Ephemerellidae	Heptageniidae	4
		Heptageniidae	<i>Stenonema modestum</i>	15
	Odonata	Aeshnidae	<i>Boyeria vinosa</i>	1
		Calopterygidae	<i>Calopteryx</i> sp.	1
			<i>Calopteryx dimidiata</i>	1
		Coenagrionidae	<i>Argia</i> sp.	1
			<i>Enallagma</i> sp.	2
	Gomphidae	<i>Progomphus</i> sp.	4	
	Veneroida	Corbiculidae	<i>Corbicula fluminea</i>	9
		Pisidiidae	<i>Pisidium</i> sp.	14
	Class: Clitellata		Oligochaeta	9

Sub-coregion /Station ID	Ref.	Order	Family	Final Identification	Individuals		
Hillabahatchee Creek							
45a-89	Yes	Amphipoda	Talitridae	<i>Hyalella azteca</i>	10		
		Coleoptera	Curculionidae	Curculionidae		1	
			Dryopidae		<i>Helichus</i> sp.	1	
			Elmidae		<i>Ancyronyx variegatus</i>	9	
					<i>Dubiraphia</i> sp.	5	
					<i>Dubiraphia bivittata</i>	9	
					<i>Dubiraphia quadrinotata</i>	4	
					Elmidae		2
					<i>Macronychus glabratus</i>	3	
					<i>Optioservus</i> sp.	5	
					<i>Promoresia tardella</i>	1	
					<i>Stenelmis</i> sp.	67	
			Gyrinidae		<i>Gyrinus</i> sp.	2	
			Diptera	Ceratopogonidae		<i>Bezzia</i> complex	2
				Chironomidae		<i>Apedilum</i> sp.	6
						Chironomidae	
					<i>Nanocladius</i> sp.	1	
					<i>Paratanytarsus</i> sp.	1	
					<i>Phaenopsectra</i> sp.	1	
					<i>Polypedilum A</i>	2	
					<i>Polypedilum fallax</i>	1	
					<i>Polypedilum halterale</i>	1	
					<i>Polypedilum scalaenum</i>	2	
					<i>Pseudochironomus</i> sp.	1	
					<i>Stelechomyia perpulchra</i>	1	
					<i>Thienemannimyia</i> group sp.	1	
					<i>Tribeios jucundus</i>	2	
					Simuliidae		<i>Simulium</i> sp.
				Tipulidae		Tipulidae	1
		Ephemeroptera	Heptageniidae		<i>Stenonema</i> sp.	17	
		Hemiptera	Veliidae		<i>Microvelia</i> sp.	1	
Isopoda	Asellidae		Asellidae	1			
Odonata	Coenagrionidae		Coenagrionidae	2			
Plecoptera	Perlidae		<i>Acroneuria internata</i>	2			
	Taeniopterygidae		<i>Strophopteryx limata</i>	41			
Trichoptera	Calamoceratidae		<i>Anisocentropus pyraloides</i>	1			
	Hydropsychidae		<i>Cheumatopsyche</i> sp.	6			
	Philopotamidae		<i>Chimarra</i> sp.	2			

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Mountain Creek						
45a-90	No	Basommatophora	Physidae	<i>Physella</i> sp.	1	
			Planorbidae	<i>Gyraulus</i> sp.	2	
		Coleoptera	Curculionidae	<i>Anchytarsus bicolor</i>	1	
			Dytiscidae	<i>Celina</i> sp.	3	
				Dytiscidae		1
			Elmidae	<i>Ancyronyx variegatus</i>	1	
				<i>Dubiraphia</i> sp.	5	
				Elmidae		4
				<i>Macronychus glabratus</i>	1	
				<i>Microcyloepus pusillus</i>	6	
				<i>Stenelmis</i> sp.	1	
			Psephenidae	<i>Psephenus herricki</i>	1	
		Decapoda	Cambaridae	<i>Procambarus spiculifer</i>	1	
		Diptera	Ceratopogonidae	Ceratopogonidae	1	
			Chironomidae	Chironominae		1
				<i>Chironomus</i> sp.	2	
				<i>Cricotopus bicinctus</i>	1	
				<i>Cricotopus/Orthocladius</i> complex	1	
				<i>Cryptochironomus</i> sp.	1	
				<i>Labrundinia pilosella</i>	1	
				<i>Microtendipes</i> sp.	65	
				<i>Orthocladius</i> sp.	2	
				<i>Parametricnemus</i> sp.	1	
				<i>Phaenopsectra obediens</i> grp.	3	
				<i>Phaenopsectra/Tribelos</i> complex	2	
				<i>Polypedilum aviceps</i>	1	
				<i>Pseudorthocladius</i> sp.	5	
				<i>Rheocricotopus</i> sp.	1	
				<i>Tanytarsus M</i>	2	
				<i>Thienemannimyia</i> group sp.	13	
				<i>Tribelos jucundus</i>	1	
			Tipulidae	<i>Leptotarsus</i> sp.	1	
				<i>Tipula</i> sp.	3	
		Ephemeroptera	Baetiscidae	<i>Baetisca carolina</i>	1	
			Heptageniidae	Heptageniidae	7	
			Leptophlebiidae	<i>Leptophlebia</i> sp.	6	
		Heteroptera	Gerridae	Gerridae	1	
		Isopoda	Asellidae	Asellidae	1	
		Odonata	Calopterygidae	<i>Calopteryx</i> sp.	2	
			Gomphidae	Gomphidae	1	
		Plecoptera	Capniidae	Capniidae	19	
			Perlodidae	Perlodidae	4	
		Trichoptera	Hydropsychidae	<i>Ceratopsyche</i> sp.	4	
<i>Cheumatopsyche</i> sp.	21					
<i>Hydropsyche</i> sp.	3					
Hydropsychidae	26					

		Leptoceridae	Leptoceridae	1
		Class: Clitellata	Oligochaeta	3

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Town Creek						
HH16	Yes	Coleoptera	Dryopidae	<i>Helichus</i> sp.	1	
			Elmidae	<i>Ancyronyx variegatus</i>	1	
				<i>Dubiraphia</i> sp.	6	
				<i>Macronychus glabratus</i>	1	
				<i>Optioservus</i> sp.	21	
				<i>Promoresia</i> sp.	1	
				<i>Promoresia tardella</i>	1	
				<i>Stenelmis</i> sp.	2	
			Gyrinidae	<i>Dineutus</i> sp.	2	
			Hydrophilidae	<i>Helophorus</i> sp.	1	
			Psephenidae	<i>Psephenus hemicki</i>	8	
			Decapoda	Cambaridae	<i>Cambarus bartonii</i>	1
			Diptera	Ceratopogonidae	<i>Bezzia</i> complex	3
				Chironomidae	<i>Ablabesmyia janta</i>	2
		<i>Apedilum</i> sp.			32	
		<i>Brillia</i> sp.			1	
		<i>Cardiocladius</i> sp.			2	
		<i>Chaetocladius</i> sp.			1	
		<i>Labrundinia</i> sp.			2	
		<i>Nanocladius</i> sp.			1	
		Orthoclaeniinae			1	
		<i>Parametricnemus</i> sp.			1	
		<i>Phaenopsectra</i> sp.			28	
		<i>Polypeditum</i> sp.			2	
		<i>Polypeditum flavum</i>			8	
		<i>Polypeditum fallax</i>			1	
		<i>Polypeditum illinoense</i>			1	
		<i>Psectrocladius</i> sp.			1	
		<i>Pseudochironomus</i> sp.			1	
		<i>Rheotanytarsus pellucidus</i>			1	
		<i>Stelechomyia perpulchra</i>			1	
		<i>Telopelopia okoboji</i>			2	
		<i>Thienemannimyia</i> group sp.			1	
		Tipulidae		<i>Pseudolimnophila</i> sp.	3	
		<i>Tipula</i> sp.		1		
		Ephemeroptera		Ephemeridae	<i>Hexagenia limbata</i>	1
		Heptageniidae		<i>Stenonema</i> sp.	8	
		Megaloptera		Corydalidae	<i>Nigronia semicomis</i>	1
		Odonata		Aeshnidae	<i>Boyeria vinosa</i>	2
			Cordulegastridae	<i>Epithea</i> sp.	4	
Plecoptera	Gomphidae	<i>Gomphus cavillaris</i>	1			
	Perlidae	<i>Acroneuria</i> sp.	7			
		<i>Acroneuria intemata</i>	1			
Taeniopterygidae	<i>Strophopteryx limata</i>	13				
Trichoptera	Calamoceratidae	<i>Anisocentropus pyraloides</i>	2			
	Hydropsychidae	<i>Cheumatopsyche</i> sp.	18			

			Hydropsychidae	1
			<i>Potamyia flava</i>	4
			Leptoceridae	1
			Philopotamidae	4
		Class: Clitellata	Oligochaeta	6

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Whooping Creek						
HH18	Yes	Basommatophora	Physidae	<i>Physella</i> sp.	1	
		Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	42	
				<i>Dubiraphia</i> sp.	2	
				<i>Macronychus glabratus</i>	3	
				<i>Stenelmis</i> sp.	7	
				Decapoda	Cambaridae	<i>Procambarus</i> sp.
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	1	
			Chironomidae	<i>Ablabesmyia</i> sp.	2	
				<i>Ablabesmyia annulata</i>	1	
				Chironomidae	2	
				<i>Clinotanypus</i> sp.	2	
				<i>Hudsonimyia</i> sp.	1	
				<i>Parametricnemus</i> sp.	1	
				<i>Rheocricotopus</i> sp.	1	
				<i>Stenochironomus</i> sp.	4	
				<i>Xyloptopus</i> par	3	
				Ephemeroptera	Baetidae	<i>Baetis</i> sp.
			Ephemeridae	<i>Hexagenia limbata</i>	20	
		Heptageniidae	<i>Stenonema</i> sp.	20		
		Isonychiidae	<i>Isonychia</i> sp.	6		
		Isopoda	Asellidae	<i>Lirceus fontinalis</i>	12	
		Megaloptera	Corydalidae	<i>Corydalus cornutus</i>	4	
		Odonata	Calopterygidae	<i>Hetaerina americana</i>	1	
			Coenagrionidae	<i>Argia</i> sp.	1	
				<i>Ischnura</i> sp.	1	
		Plecoptera	Taeniopterygidae	<i>Taeniopteryx</i> sp.	1	
		Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	63	
				<i>Hydropsyche</i> sp.	7	
				<i>Oecetis inconspicua</i>	2	
			Philopotamidae	<i>Chimarra</i> sp.	9	
Polycentropodidae	<i>Neureclipsis</i> sp.		2			
Veneroida	Corbiculidae	<i>Corbicula fluminea</i>	10			

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Rae's Creek						
65c-3	No	Basommatophora	Physidae	<i>Physella</i> sp.	3	
		Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	2	
				<i>Stenelmis</i> sp.	1	
			Psephenidae	<i>Psephenus herricki</i>	1	
		Decapoda	Cambaridae	Cambannae		1
		Diptera	Chironomidae	<i>Ablabesmyia</i> sp.	1	
				<i>Ablabesmyia mallochi</i>	3	
				<i>Brillia</i> sp.	8	
				Chironomidae	2	
				<i>Phaenopsectra</i> sp.	2	
				<i>Polypedilum</i> sp.	4	
				<i>Polypedilum aviceps</i>	30	
				<i>Poithastia</i> sp.	1	
				<i>Rheocricotopus</i> sp.	3	
				<i>Rheocricotopus robacki</i>	4	
				<i>Stenochironomus</i> sp.	1	
				<i>Tanytarsus</i> L.	1	
				<i>Thienemannimyia</i> group sp.	4	
				<i>Tribelos</i> sp.	2	
				<i>Tribelos jucundus</i>	21	
				Simuliidae	<i>Simulium</i> sp.	5
				Ephemeroptera	Ephemerellidae	<i>Attenella attenuata</i>
		Heptageniidae	<i>Stenonema</i> sp.		55	
		Megaloptera	Corydalidae	<i>Corydalis comutus</i>	1	
		Odonata	Coenagrionidae	<i>Chromagrion conditum</i>	1	
				Coenagrionidae	2	
		Trichoptera	Hydropsychidae	<i>Ceratopsyche spama</i>	4	
<i>Cheumatopsyche</i> sp.	7					
<i>Hydropsyche</i> sp.	3					
Class: Clitellata			Oligochaeta	3		

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Rocky Creek						
65c-4	No	Basommatophora	Physidae	<i>Physa</i> sp.	12	
			Planorbidae	Planorbidae	1	
		Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	2	
				<i>Dubiraphia vittata</i>	1	
			Sphaeriidae	Sphaeriidae	4	
		Decapoda	Cambaridae	<i>Procambarus</i> sp.	1	
		Diptera	Ceratopogonidae	Bezzia complex	2	
				Chironomidae	<i>Ablabesmyia</i> sp.	8
					<i>Ablabesmyia hauberi</i>	5
					<i>Ablabesmyia mallochi</i>	23
					<i>Ablabesmyia peleensis</i>	1
					<i>Apedilum</i> sp.	1
					<i>Chironomus decorus</i>	1
					<i>Conchapelopia</i> sp. (aberrant 6 teeth)	1
					<i>Dicrotendipes</i> sp.	19
					<i>Dicrotendipes</i> A	13
					<i>Glyptotendipes</i> sp.	1
					<i>Nanocladius</i> sp.	1
					<i>Parachironomus tenuicaudatus</i> complex	1
					<i>Paratanytarsus</i> sp.	1
					<i>Paratanytarsus</i> D	1
					<i>Paratanytarsus dissimilis</i>	2
					<i>Phaenopsectra obediens</i> grp.	9
					<i>Phaenopsectra punctipes</i> grp.	3
					<i>Polypedilum halterale</i>	1
					<i>Polypedilum scalaenum</i>	1
					<i>Polypedilum tritum</i>	1
					<i>Procladius</i> sp.	2
					<i>Procladius</i> (<i>Holotanypus</i>) sp.	1
					<i>Rheotanytarsus exiguus</i> group	7
					<i>Rheotanytarsus pellucidus</i>	1
					Tribe Tanytarsini	2
					<i>Tanytarsus</i> C	2
					<i>Tanytarsus</i> P	2
		<i>Tanytarsus</i> T	2			
		<i>Tanytarsus</i> U	2			
<i>Thienemannimyia</i> group sp.	20					
<i>Tribelos atrum</i>	8					
<i>Tribelos fuscicome</i>	3					

			<i>Trissopelopia ogemawi</i>	2
		Tipulidae	<i>Tipula</i> sp.	1
	Heteroptera	Nepidae	<i>Ranatra buenoi</i>	1
	Odonata	Calopterygidae	Calopterygidae	1
		Coenagrionidae	<i>Argia</i> sp.	19
			Coenagrionidae	3
			<i>Enallagma</i> sp.	18
			<i>Enallagma divagans</i>	1
			<i>Ischnura</i> sp.	2
		Gomphidae	Gomphidae	2
	Class: Clitellata		Oligochaeta	8

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals		
Sweetwater Creek							
65c-8	No	Coleoptera	Dytiscidae	<i>Hydroporus</i> sp.	7		
			Elmidae	<i>Stenelmis</i> sp.	2		
		Diptera	Chironomidae	<i>Ablabesmyia</i> sp.	2		
				<i>Ablabesmyia aspera</i>	1		
				<i>Ablabesmyia mallochi</i>	11		
				<i>Corynoneura</i> sp.	1		
				<i>Cricotopus politus</i>	1		
				<i>Dicrotendipes</i> sp.	4		
				<i>Gillotia alboviridis</i>	1		
				<i>Glyptotendipes</i> B	2		
				<i>Microtendipes pedellus</i>	1		
				<i>Nanocladius</i> sp.	1		
				<i>Orthocladius obumbratus</i>	1		
				<i>Parametricnemus</i> sp.	1		
				<i>Phaenopsectra</i> sp.	1		
				<i>Phaenopsectra obediens</i> grp.	10		
				<i>Phaenopsectra/Tribelos</i> complex	5		
				<i>Polypedilum aviceps</i>	4		
				<i>Polypedilum flavum</i>	3		
				<i>Rheotanytarsus pellucidus</i>	1		
				<i>Stenochironomus</i> sp.	9		
				Tanytopodinae	1		
				Tribe Tanytarsini	2		
				<i>Tanytarsus</i> sp.	4		
				<i>Tanytarsus</i> L	2		
				<i>Thienemannimyia</i> group sp.	6		
				<i>Tribelos fuscicome</i>	1		
				<i>Tribelos jucundus</i>	5		
				<i>Unniella multivirga</i>	4		
				Empididae	<i>Hemerodromia</i> sp.	1	
					<i>Rhamphomyia</i> sp.	1	
				Simuliidae	<i>Prosimulium</i> sp.	41	
					<i>Simulium</i> sp.	28	
				Ephemeroptera	Caenidae	<i>Caenis</i> sp.	1
					Heptageniidae	<i>Stenonema terminatum</i>	3
		Trichoptera	Hydropsychidae	<i>Ceratopsyche spama</i>	2		
				<i>Cheumatopsyche</i> sp.	38		
				Hydropsychidae	5		
			Leptoceridae	<i>Oecetis</i> sp.	1		
			Polycentropodidae	<i>Cermetina</i> sp.	1		
<i>Polycentropus</i> sp.	7						
Veneroida	Pisidiidae	Pisidiidae	2				

Sub-coregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Magtail Branch					
65c-12	No	Amphipoda	Talitridae	<i>Hyalella azteca</i>	2
			Coleoptera	Curculionidae	<i>Anchytarsus bicolor</i>
		Dytiscidae		<i>Hydaticus</i> sp.	1
				<i>Hydroporus</i> sp.	2
		Elmidae	<i>Ancyronyx variegatus</i>	3	
			<i>Stenelmis</i> sp.	1	
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	5
			Chironomidae	<i>Ablabesmyia</i> sp.	2
				<i>Ablabesmyia mallochi</i>	3
				Chironominae	1
				<i>Corynoneura</i> sp.	2
				<i>Dicrotendipes</i> sp.	1
				<i>Heterotrissocladius Cladwell/boltoni</i>	1
				<i>Labrundinia</i> sp.	1
				<i>Labrundinia pilosella</i>	6
				<i>Larsia</i> sp.	1
				<i>Micropsectra D</i>	1
				<i>Microtendipes rydalensis</i>	1
				<i>Neozavrelia</i> sp.	1
				<i>Paralauterbomiella nigrohalterale</i>	2
				<i>Parametricnemus</i> sp.	1
				<i>Paratendipes subaequalis</i>	1
				<i>Phaenopsectra obediens</i> grp.	3
				<i>Phaenopsectra punctipes</i> grp.	1
				<i>Polypedilum aviceps</i>	1
				<i>Polypedilum laetum</i>	1
				<i>Psilometricnemus triannulatus</i>	1
				<i>Rheotanytarsus</i> sp.	1
				<i>Rheotanytarsus exiguus</i> grp.	7
				<i>Rheotanytarsus pellucidus</i>	1
				<i>Stempellinella</i> sp.	1
				<i>Stempellinella A</i>	3
				<i>Stempellinella B</i>	1
<i>Stempellinella leptocelloides</i>	2				
<i>Stenochironomus</i> sp.	6				
Tanypodinae	1				
Tribe Tanytarsini	3				
<i>Tanytarsus</i> sp.	7				
<i>Tanytarsus A</i>	2				
<i>Tanytarsus L</i>	3				

			<i>Tanytarsus M</i>	1
			<i>Tanytarsus S</i>	1
			<i>Tanytarsus T</i>	2
			<i>Tanytarsus W</i>	1
			<i>Thienemannimyia</i> group sp.	12
			<i>Tribelos jucundus</i>	2
			<i>Unniella multivirga</i>	1
		Dixidae	<i>Dixella indiana</i>	2
		Empididae	<i>Hemerodromia</i> sp.	2
		Tabanidae	<i>Tabanus</i> sp.	2
		Tipulidae	<i>Pseudolimnophila</i> sp.	2
			<i>Tipula</i> sp.	1
	Ephemeroptera	Ephemerellidae	<i>Eurylophella bicolor</i>	4
		Ephemeridae	<i>Hexagenia limbata</i>	1
		Heptageniidae	<i>Stenonema</i> <i>terminatum</i>	38
		Leptophlebiidae	<i>Paraleptophlebia</i> sp.	48
		Potamanthidae	<i>Potamanthus</i> <i>distinctus</i>	4
	Odonata	Calopterygidae	<i>Calopteryx</i> sp.	1
		Coenagrionidae	<i>Argia</i> sp.	2
		Corduliidae	<i>Macromia</i> sp.	1
		Gomphidae	Gomphidae	4
			<i>Progomphus</i> sp.	4
		Libellulidae	<i>Brachymesia gravida</i>	1
	Plecoptera	Perlidae	<i>Eccoptura xanthenes</i>	1
			<i>Perlستا</i> sp.	1
			<i>Perlinella drymo</i>	1
		Perlodidae	<i>Isoperla marlynia</i>	2
	Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	4
		Lepidostomatidae	<i>Lepidostoma</i> sp.	1
		Leptoceridae	<i>Ceraclea diluta</i>	1
			Leptoceridae	1
			<i>Oecetis</i> sp.	1
		Limnephilidae	<i>Pycnopsyche</i> sp.	2
		Molannidae	<i>Molanna tryphena</i>	2
	Veneroida	Pisidiidae	<i>Sphaerium</i> sp.	1

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Deep Creek					
65c-40	No	Coleoptera	Curculionidae	<i>Anchytarsus bicolor</i>	4
			Dytiscidae	<i>Liodessus</i> sp.	1
			Elmidae	<i>Ancyronyx variegatus</i>	2
				<i>Stenelmis</i> sp.	8
				<i>Stenelmis antennalis</i>	1
		Decapoda	Cambaridae	<i>Cambarinae</i>	4
				<i>Procambarus gibbus</i>	2
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	3
				<i>Dasyhelea</i> sp.	3
			Chironomidae	<i>Ablabesmyia mallochii</i>	1
				<i>Ablabesmyia simpsoni</i>	1
				Chironominae	1
				<i>Clinotanypus</i> sp.	2
				<i>Corynoneura</i> sp.	1
				<i>Djalmabatista pulcher</i> variant (5 toothed)	1
				<i>Georthocladus</i> sp.	1
				Hamischia Complex D	3
				<i>Labrundinia</i> sp.	2
				<i>Manoa</i> sp.	6
				<i>Microtendipes</i> sp.	2
				<i>Microtendipes pedellus</i> grp.	4
				<i>Microtendipes rydalensis</i>	1
				<i>Nanocladus</i> sp.	4
				<i>Nilothauma</i> sp.	1
				Orthoclaadiinae	1
				<i>Parametricnemus</i> sp.	1
				<i>Paraphaenocladus</i> sp.	1
				<i>Paratanytarsus</i> sp.	1
				<i>Phaenopsectra</i> sp.	2
				<i>Phaenopsectra obediens</i> grp.	2
				<i>Phaenopsectra punctipes</i> grp.	1
				<i>Polypedilum flavum</i>	1
				<i>Procladius</i> sp.	1
				<i>Procladius (Holotanypus)</i> sp.	1
<i>Pseudorthocladus</i> sp.	1				
<i>Rheocricotopus robacki</i>	5				
<i>Stelechomyia perpulchra</i>	1				
<i>Stempellinella</i> sp.	1				
<i>Stempellinella A</i>	6				
<i>Stempellinella leptocelloides</i>	2				
<i>Stenochironomus</i> sp.	6				
Tanypodinae	1				
<i>Tanytarsus O</i>	1				

			<i>Telopelopia okoboji</i>	2
			<i>Thienemannimyia</i> group sp.	75
			<i>Unniella multivirga</i>	7
			<i>Xenochironomus</i> <i>xenolabis</i>	1
		Simuliidae	<i>Simulium</i> sp.	7
		Tipulidae	<i>Hexatoma</i> sp.	1
			Tipulidae	1
Ephemeroptera	Ephemeridae	<i>Hexagenia limbata</i>	1	
	Heptageniidae	Heptageniidae	3	
	Isonychiidae	<i>Isonychia</i> sp.	1	
	Leptophlebiidae	Leptophlebiidae	6	
	Polymitarcyidae	<i>Ephoron leukon</i>	1	
Megaloptera	Corydalidae	<i>Nigronia semicomis</i>	1	
Odonata	Aeshnidae	<i>Boyeria vinosa</i>	1	
	Calopterygidae	<i>Calopteryx</i> sp.	1	
		<i>Calopteryx maculata</i>	1	
	Coenagrionidae	<i>Argia</i> sp.	1	
	Corduliidae	<i>Neurocordulia</i> <i>alabamensis</i>	1	
		<i>Somatochlora linearis</i>	1	
	Macromiidae	<i>Macromia taeniolata</i>	1	
Plecoptera	Chloroperlidae	Chloroperlidae	1	
	Leuctridae	<i>Leuctra</i> sp.	1	
	Nemouridae	Nemouridae	1	
	Perlidae	<i>Acroneuria lycoriais</i>	1	
		<i>Beloneuria</i> sp.	1	
		Perlidae	1	
	Taeniopterygidae	Taeniopterygidae	2	
Trichoptera	Brachycentridae	<i>Brachycentrus chelatus</i>	1	
	Calamoceratidae	<i>Anisocentropus</i> <i>pyraloides</i>	4	
	Hydropsychidae	<i>Hydropsyche scalaris</i>	6	
		Hydropsychidae	1	
	Leptoceridae	Leptoceridae	1	
	Philopotamidae	<i>Chimarra</i> sp.	4	
	Polycentropodidae	<i>Neureclipsis</i> sp.	5	
		Polycentropodidae	1	

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Lanahassee Creek						
65c-80	Yes	Amphipoda	Talitridae	<i>Hyalella azteca</i>	5	
		Architaenioglossa	Viviparidae	<i>Campeloma limum</i>	3	
		Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	2	
				<i>Macronychus glabratus</i>	1	
		Decapoda	Cambaridae	Cambarinae	1	
		Diptera	Ceratopogonidae	Bezzia complex	2	
				Chironomidae	<i>Ablabesmyia</i> sp.	3
					<i>Ablabesmyia mallochi</i>	5
					<i>Apedilum</i> sp.	56
					Chironomidae	2
					<i>Clinotanytus</i> sp.	4
					<i>Dicrotendipes</i> sp.	3
					<i>Hudsonimyia</i> sp.	1
					<i>Hydrobaenus</i> sp.	2
					<i>Larsia</i> sp.	1
					<i>Monopelopia</i> sp.	1
					<i>Monopelopia boliekae</i>	1
					<i>Monopelopia tillandsia</i>	3
					<i>Natarsia</i> sp.	1
					<i>Paramerina</i> sp.	1
					<i>Parametriochnemus</i> sp.	7
					<i>Paratanytarsus</i> sp.	5
					<i>Phaenopsectra</i> sp.	17
					<i>Polypedilum</i> sp.	2
					<i>Polypedilum aviceps</i>	4
					<i>Polypedilum flavum</i>	13
					<i>Polypedilum tritum</i>	5
					<i>Procladius</i> sp.	2
					<i>Pseudorthocladius</i> sp.	1
					<i>Rheotanytarsus</i> sp.	5
					<i>Stenochironomus</i> sp.	2
					<i>Tanytarsus</i> sp.	10
		<i>Thienemannimyia</i> group sp.	18			
<i>Xestochironomus</i> sp.	1					
Ephemeroptera	Ephydriidae	<i>Hydrellia</i> sp.	1			
	Ephemeridae	<i>Hexagenia limbata</i>	3			
Megaloptera	Heptageniidae	<i>Stenonema</i> sp.	3			
	Sialidae	<i>Sialis mohri</i>	1			
Neotaenioglossa	Pleuroceridae	<i>Elimia</i> sp.	1			
		<i>Pleurocera</i> sp.	1			

	Odonata	Coenagrionidae	Coenagrionidae	4
	Plecoptera	Perlidae	<i>Acroneuria</i> sp.	2
		Taeniopterygidae	<i>Strophopteryx</i> sp.	2
	Trichoptera	Calamoceratidae	<i>Anisocentropus pyraloides</i>	3
		Hydropsychidae	<i>Cheumatopsyche</i> sp.	1
			<i>Potamyia flava</i>	1
		Leptoceridae	<i>Leptocerus americanus</i>	1
		Limnephilidae	<i>Hydatophylax argus</i>	3
		Polycentropodidae	<i>Neureclipsis</i> sp.	4
			<i>Nyctiophylax</i> sp.	1
	<i>Polycentropus</i> sp.		7	
			Nemata	6
	Class: Clitellata		Oligochaeta	5

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals
Hichitee Creek					
65c-88	No	Coleoptera	Elmidae	<i>Stenelmis</i> sp.	2
		Decapoda	Cambaridae	Cambarinae	9
		Diptera	Ceratopogonidae	<i>Bezzia complex</i>	13
			Chironomidae	<i>Ablabesmyia</i> sp.	6
				<i>Ablabesmyia mallochi</i>	10
				<i>Brillia flavifrons</i>	1
				<i>Chironomus ochreateus</i>	1
				<i>Corynoneura</i> sp.	1
				<i>Gillotia albovindus</i>	2
				<i>Goeldichironomus</i> sp.	1
				<i>Larsia</i> sp.	1
				Orthoclaadiinae	1
				<i>Paramerina</i> sp.	2
				<i>Phaenopsectra obediens</i>	18
				<i>Phaenopsectra/Tribelos complex</i>	2
				<i>Polypedilum A</i>	3
				<i>Polypedilum flavum</i>	21
				<i>Polypedilum halterale</i>	4
				<i>Polypedilum illinoense</i>	2
				<i>Polypedilum scalaenum</i>	20
				<i>Reomyia</i> sp.	1
				<i>Rheocricotopus</i> sp.	6
				<i>Rheocricotopus robacki</i>	2
				<i>Rheotanytarsus</i> sp.	1
				<i>Rheotanytarsus exiguus</i> group	1
				<i>Rheotanytarsus pellucidus</i>	2
				<i>Robackia claviger</i>	1
				<i>Stelechomyia perpulchra</i>	3
				<i>Stempellinella</i> sp.	1
				<i>Stempellinella A</i>	1
				<i>Stempellinella leptocelloides</i>	1
				<i>Stenochironomus</i> sp.	3
				Tanypodinae	1
				<i>Tanytarsus</i> sp.	4
				<i>Tanytarsus C</i>	1
				<i>Tanytarsus O</i>	1
				<i>Tanytarsus T</i>	2
				<i>Tanytarsus U</i>	1
				<i>Thienemannimyia</i> group sp.	9
				<i>Tribelos</i> sp.	1
				<i>Tribelos jucundus</i>	3
				<i>Trissopelopia ogemawi</i>	1
Empididae	<i>Hemerodromia</i> sp.	4			
Simuliidae	<i>Simulium</i> sp.	1			

		Tipulidae	<i>Hexatoma</i> sp.	1
			<i>Limnophila</i> sp.	2
			Tipulidae	3
	Ephemeroptera	Caenidae	<i>Caenis</i> sp.	1
		Ephemerellidae	<i>Attenella attenuata</i>	3
		Ephemeridae	<i>Hexagenia limbata</i>	11
		Heptageniidae	<i>Stenonema terminatum</i>	4
		Tricorythidae	Tricorythidae	1
	Heteroptera	Gerridae	Gerridae	1
	Megaloptera	Corydalidae	<i>Corydalus cornutus</i>	1
			<i>Nigronia semicomis</i>	1
	Odonata	Coenagrionidae	<i>Argia</i> sp.	2
		Libellulidae	Libellulidae	1
	Plecoptera	Perlidae	<i>Acroneuria lyconias</i>	7
	Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	2
		Leptoceridae	<i>Oecetis</i> sp.	3
		Class: Clitellata	Oligochaeta	1

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Hollis Creek					
65c-89	Yes	Coleoptera	Elmidae	<i>Ancyronyx variegatus</i>	1
				<i>Dubiraphia</i> sp.	1
				<i>Macronychus glabratus</i>	1
				<i>Stenelmis</i> sp.	3
		Decapoda	Cambaridae	Cambarinae	5
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	2
				<i>Ablabesmyia</i> sp.	7
			Chironomidae	<i>Ablabesmyia rhamphe</i> grp.	2
				<i>Apedilum</i> sp.	16
				Chironomidae	3
				<i>Clinotanypus</i> sp.	1
				<i>Conchapelopia</i> sp.	1
				<i>Doithix</i> sp.	1
				<i>Georthocladius</i> sp.	3
				<i>Helopelopia</i> sp.	6
				<i>Labrundinia</i> sp.	2
				<i>Larsia</i> sp.	1
				<i>Parametricnemus</i> sp.	1
				<i>Phaenopsectra</i> sp.	40
				<i>Polypedilum fallax</i>	1
				<i>Rheotanytarsus</i> sp.	1
				<i>Stelechomyia perpulchra</i>	3
				<i>Stenochironomus</i> sp.	5
				Tanypodinae	1
				<i>Tanytarsus</i> sp.	4
				<i>Thienemannimyia</i> group sp.	47
			<i>Xestochironomus</i> sp.	1	
			<i>Xylotopus par</i>	1	
		Simuliidae	<i>Simulium</i> sp.	2	
		Tipulidae	<i>Tipula</i> sp.	1	
		Ephemeroptera	Heptageniidae	<i>Stenonema</i> sp.	3
		Megaloptera	Corydalidae	<i>Nigronia semicomis</i>	1
		Odonata	Calopterygidae	<i>Calopteryx</i> sp.	2
			Coenagrionidae	Coenagrionidae	4
			Corduliidae	<i>Neurocordulia</i> sp.	3
			Gomphidae	<i>Dromogomphus spinosus</i>	1
		Plecoptera	Perlidae	<i>Acroneuria lycoiris</i>	2
<i>Perlinella</i> sp.	2				
Trichoptera	Calamoceratidae	<i>Anisocentropus pyraloides</i>	1		
		<i>Cheumatopsyche</i> sp.	1		
		<i>Macrostemum</i> sp.	8		
Class: Clitellata				<i>Oligochaeta</i>	3

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Whitewater Creek						
HH24	Yes	Coleoptera	Elmidae	Elmidae	4	
			Psephenidae	<i>Ectopria</i> sp.	2	
		Diptera	Chironomidae	Ablabesmyia	<i>Ablabesmyia mallochi</i>	1
				<i>Apedilum</i> sp.	29	
				Chironomidae	3	
				<i>Conchapelopia</i> sp.	14	
				<i>Harnischia</i> Complex D	1	
				<i>Helopelopia</i> sp.	1	
				<i>Heterotrissocladius</i> C	1	
				<i>Manoa</i> sp.	4	
				<i>Microtendipes rydalensis</i>	4	
				<i>Parametriocnemus</i> sp.	2	
				<i>Paratanytarsus</i> sp.	7	
				<i>Phaenopsectra</i> sp.	6	
				<i>Polypedilum</i> sp.	1	
				<i>Polypedilum aviceps</i>	6	
				<i>Polypedilum flavum</i>	23	
				<i>Polypedilum halterale</i>	1	
				<i>Polypedilum scalaenum</i>	1	
				<i>Procladius</i> sp.	2	
				<i>Rheocricotopus</i> sp.	3	
				<i>Rheocricotopus tuberculatus</i>	1	
				<i>Rheotanytarsus</i> sp.	6	
				Tanypodinae	2	
				<i>Tanytarsus</i> sp.	6	
				<i>Tanytarsus M</i>	2	
				<i>Telopelopia okoboji</i>	1	
				<i>Thienemannimyia</i> group sp.	11	
				<i>Zavrelia</i> sp.	1	
				Simuliidae	<i>Simulium</i> sp.	4
		Ephemeroptera	Ephemerellidae	<i>Eurylophella bicolor</i>	1	
			Ephemeridae	<i>Hexagenia limbata</i>	2	
		Megaloptera	Corydalidae	<i>Nigronia serricornis</i>	2	
			Odonata	Coenagrionidae	1	
		Odonata	Corduliidae	Corduliidae	1	
			Gomphidae	Gomphidae	1	
			Plecoptera	Perlidae	<i>Acroneuria</i> sp.	1
		<i>Agneta capitata</i>			2	
		Trichoptera	Calamoceratidae	<i>Anisocentropus pyraloides</i>	1	
				Hydropsychidae	<i>Cheumatopsyche</i> sp.	7
			Hydropsychidae	<i>Hydropsyche</i> sp.	19	
			Leptoceridae	<i>Triaenodes new</i> sps. A?	2	
Philopotamidae	<i>Chimarra</i> sp.		21			
Polycentropodidae	<i>Neureclipsis</i> sp.		6			
	<i>Polycentropus</i> sp.		3			
Class: Clitellata		Oligochaeta	3			

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Pine Knot Creek						
HH25	Yes	Coleoptera	Elmidae	<i>Gonielmis dietrichi</i>	2	
				<i>Macronychus glabratus</i>	5	
				<i>Promoresia tardella</i>	2	
				<i>Stenelmis</i> sp.	3	
				Gyrinidae	<i>Dineutus</i> sp.	1
				Psephenidae	<i>Ectopria</i> sp.	2
			Diptera	Ceratopogonidae	<i>Bezzia</i> complex	3
				Chironomidae	<i>Ablabesmyia mallochi</i>	1
					<i>Ablabesmyia rhamph</i> grp.	2
					<i>Apedilum</i> sp.	23
					<i>Cladotanytarsus</i> sp.	1
					<i>Georthocladius</i> sp.	5
		<i>Paratanytarsus</i> sp.			15	
		<i>Phaenopsectra</i> sp.			34	
		<i>Polypedium aviceps</i>			1	
		<i>Stelechomyia perpulchra</i>			2	
		<i>Stenochironomus</i> sp.			3	
		<i>Thienemannimyia</i> group sp.			1	
		Simuliidae			<i>Simulium</i> sp.	4
		Tipulidae		<i>Dicranota</i> sp.	1	
		Ephemeroptera		Heptageniidae	<i>Stenonema</i> sp.	10
		Megaloptera	Corydalidae	<i>Nigronia serricornis</i>	1	
		Odonata	Coenagrionidae	Coenagrionidae	2	
			Cordulegastridae	<i>Epithea</i> sp.	7	
		Plecoptera	Perlidae	<i>Acroneuria</i> sp.	5	
				Perlidae	1	
			Taeniopterygidae	<i>Strophopteryx fasciata</i>	3	
				<i>Strophopteryx limata</i>	17	
		Trichoptera	Brachycentridae	<i>Brachycentrus</i> sp.	3	
			Calamoceratidae	<i>Anisocentropus pyraloides</i>	1	
			Hydropsychidae	<i>Arctopsyche</i> sp.	2	
				<i>Potamyia flava</i>	5	
			Leptoceridae	<i>Mystacides sepulchralis</i>	8	
Philopotamidae	<i>Chimarra</i> sp.		1			
Polycentropodidae	<i>Neureclipsis</i> sp.		5			

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals		
Shoal Creek							
HH26	Yes	Coleoptera	Dytiscidae	<i>Liodessus</i> sp.	1		
			Elmidae	<i>Macronychus glabratus</i>	5		
				<i>Microcyloepus pusillus</i>	3		
				<i>Optioservus</i> sp.	1		
				<i>Promoresia elegans</i>	1		
				<i>Stenelmis</i> sp.	3		
				<i>Ectopria</i> sp.	1		
			Psephenidae	Cambarinae	4		
			Decapoda	Cambaridae	Cambarinae	4	
			Diptera	Chironomidae	<i>Ablabesmyia mallochii</i>	7	
		<i>Ablabesmyia rhamphe</i> grp.			1		
		<i>Apedilum</i> sp.			39		
		Chironomidae			1		
		<i>Clinotanytus</i> sp.			3		
		<i>Conchapelopia</i> sp.			13		
		<i>Cryptochironomus</i> sp.			1		
		<i>Harmischia</i> Complex D			4		
		<i>Helopelopia</i> sp.			7		
		<i>Larsia</i> sp.			1		
		<i>Orthocladius luteipes</i>			1		
		<i>Phaenopsectra</i> sp.			13		
		<i>Polypedilum aviceps</i>			4		
		<i>Polypedilum bergi</i>			1		
		<i>Polypedilum flavum</i>			1		
		<i>Procladius</i> sp.			12		
		<i>Stenochironomus</i> sp.			5		
		Tanypodinae			2		
		<i>Telopelopia okoboji</i>			2		
		<i>Thienemannimyia</i> group sp.			11		
		Simuliidae			<i>Simulium</i> sp.	2	
		Ephemeroptera			Heptageniidae	<i>Stenonema</i> sp.	3
		Megaloptera			Sialidae	<i>Sialis mohri</i>	4
		Odonata	Calopterygidae	<i>Calopteryx angustipennis</i>	4		
				Coenagrionidae	<i>Chromagrion</i> sp.	8	
			Corduliidae	<i>Williamsonia</i> sp.	1		
			Gomphidae	<i>Dromogomphus amatus</i>	1		
		Plecoptera	Taeniopterygidae	<i>Strophopteryx fasciata</i>	2		
		Trichoptera	Leptoceridae	<i>Leptocerus americanus</i>	1		
				<i>Oecetis</i> sp.	1		
			Limnephilidae	Limnephilidae	1		
			Polycentropodidae	<i>Nyctophylax</i> sp.	4		
<i>Polycentropus</i> sp.	1						
Class: Clitellata				Oligochaeta	5		

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Jack's River						
66g-2	Yes	Coleoptera	Elmidae	<i>Dubiraphia</i> sp.	14	
				Elmidae	14	
				<i>Gonielmis dietrichi</i>	37	
				<i>Microcylloepus pusillus</i>	2	
				<i>Promoresia elegans</i>	6	
				<i>Stenelmis</i> sp.	22	
			Psephenidae	Psephenidae	1	
			Diptera	Chironomidae	<i>Psephenus herricki</i>	2
					Chironomidae	1
					<i>Rheotanytarsus exiguus</i> group	2
		Tveteria vitracies		5		
		Simuliidae		<i>Simulium</i> sp.	9	
		Tipulidae		<i>Hexatoma</i> sp.	4	
			<i>Tipula</i> sp.	1		
		Ephemeroptera	Baetidae	<i>Pseudocloeon</i> sp.	12	
			Heptageniidae	<i>Stenonema</i> sp.	9	
		Hemiptera	Veliidae	<i>Rhagovelia obesa</i>	1	
		Heteroptera		<i>Paravelia</i> sp.	1	
		Megaloptera	Corydalidae	Corydalidae	1	
				<i>Corydalus cornutus</i>	6	
		Neotaenioglossa	Pleuroceridae	<i>Elimia</i> sp.	1	
		Odonata	Gomphidae	Gomphidae	1	
		Plecoptera	Perlidae	<i>Acroneunia abnormis</i>	10	
				<i>Paragnetina media</i>	1	
				<i>Perlesta</i> sp.	2	
		Trichoptera	Brachycentridae	Brachycentridae	3	
Hydropsychidae	<i>Cheumatopsyche</i> sp.		13			
	<i>Hydropsyche</i> sp.		29			
	Hydropsychidae		8			
Philopotamidae	<i>Chimarra</i> sp.		1			
Polycentropodidae	<i>Polycentropus</i> sp.		5			

Sub-region /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Rough Creek						
66g-2-2	Yes	Coleoptera	Elmidae	Elmidae	1	
				<i>Optioservus</i> sp.	3	
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	4	
				Chironomidae	Chironomidae	2
			<i>Georthocladius</i> sp.		1	
			<i>Hudsonomyia</i> sp.		1	
			<i>Micropsectra</i> sp.		3	
			<i>Microtendipes</i> sp.		1	
			Orthoclaeniinae		6	
			<i>Parametriocnemus</i> sp.		2	
			<i>Polypedilum</i> A		1	
			<i>Pseudorthocladius</i> sp.		2	
			<i>Stempellinella</i> sp.		6	
			Tribe Tanytarsini		1	
			<i>Thienemanniella lobapodema</i>		1	
			<i>Thienemannimyia</i> group sp.		1	
			Tipulidae		<i>Hexatoma</i> sp.	3
					<i>Pseudolimnophila</i> sp.	2
				Tipulidae	3	
		Ephemeroptera	Ephemerellidae	<i>Ephemerella</i> sp.	4	
				<i>Ephemerella crenula</i>	2	
				<i>Euryophella doris</i> complex	1	
			Heptageniidae	<i>Epeorus</i> sp.	4	
				<i>Epeorus dispar</i>	6	
				<i>Epeorus pleuralis</i>	5	
				<i>Stenonema</i> sp.	15	
			Leptophlebiidae	Leptophlebiidae	2	
			Siphonuridae	Siphonuridae	3	
			Isopoda	Asellidae	Asellidae	5
		<i>Lirceus</i> sp.			14	
		Plecoptera	Capniidae	Capniidae	11	
			Chloroperlidae	Chloroperlidae	4	
				<i>Utaperla</i> sp.	18	
			Peltoperlidae	<i>Tallaperla</i> sp.	4	
			Perlidae	<i>Acroneuria abnormis</i>	4	
			Perlodidae	<i>Diploperla duplicata</i>	1	
				<i>Isoperla similis</i>	1	
			Pteronarcyidae	<i>Pteronarcys dorsata</i>	1	
			Taeniopterygidae	<i>Oemopteryx</i> complex	3	
			<i>Taeniopteryx</i> sp.	10		
		Trichoptera	Brachycentridae	<i>Micrasema</i> sp.	4	
			Hydropsychidae	<i>Hydropsyche</i> sp.	2	
			Lepidostomatidae	<i>Lepidostoma</i> sp.	9	
			Limnephilidae	<i>Hydatophylax argus</i>	21	
		Limnephilidae			5	

			Odontoceridae	<i>Marilia flexuosa</i>	2
			Polycentropodidae	<i>Nyctiophylax</i> sp.	1
				Polycentropodidae	2
		Class: Clitellata		Oligochaeta	4

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Mill Creek						
66g-5	Yes	Coleoptera	Elmidae	Elmidae	1	
				<i>Microcylloepus pusillus</i>	1	
				<i>Optioservus</i> sp.	11	
			Psephenidae	<i>Ectopria</i> sp.	1	
				<i>Psephenus hemicki</i>	7	
			Diptera	Ceratopogonidae	Bezzia complex	1
					Chironomidae	<i>Apedilum</i> sp.
				Chironomidae		2
				Chironominae		3
				<i>Corynoneura</i> sp.		2
		<i>Corynoneura</i> B		1		
		<i>Eukiefferiella</i> sp.		1		
		<i>Heterotrissocladius Cladwell/boltoni</i>		1		
		<i>Heterotrissocladius marcidus</i>		1		
		<i>Hydrobaenus</i> sp.		1		
		<i>Microtendipes</i> sp.		26		
		<i>Nanocladius</i> sp.		2		
		Orthoclaadiinae		3		
		<i>Parakiefferiella coronata</i>		1		
		<i>Polypedium aviceps</i>		1		
		<i>Polypedium flavum</i>		2		
		Tanypodinae		1		
		<i>Thienemanniella lobapodema</i>		1		
		Dixidae		<i>Dixa</i> sp.	4	
		Simuliidae		<i>Simulium</i> sp.	1	
		Tipulidae		<i>Dicranota</i> sp.	2	
				<i>Hexatoma</i> sp.	3	
				<i>Tipula</i> sp.	2	
		Ephemeroptera		Baetidae	<i>Pseudocloeon</i> sp.	1
				Baetiscidae	Baetiscidae	1
				Ephemerellidae	<i>Attenella attenuata</i>	13
					<i>Dannella</i> sp.	2
			<i>Dannella lita</i>		2	
			Ephemerellidae		2	
			<i>Euryophella</i> sp.		3	
			Heptageniidae	<i>Epeorus</i> sp.	9	
				<i>Epeorus pleuralis</i>	1	
				Heptageniidae	1	
				<i>Stenonema</i> sp.	8	
			Isonychiidae	<i>Isonychia</i> sp.	4	
			Leptophlebiidae	Leptophlebiidae	2	
Siphonuridae	Siphonuridae		2			
Megaloptera	Corydaliidae	Corydaliidae	1			
		<i>Corydalis comutus</i>	1			

			<i>Nigronia sericomis</i>	1
	Odonata	Cordulegastriidae	<i>Cordulegaster</i> sp.	1
			Gomphidae	Gomphidae
	Plecoptera	Capniidae	<i>Allocapnia</i> sp.	2
			Capniidae	
		Chloroperlidae	<i>Alloperla</i> sp.	1
			Chloroperlidae	1
			Haploperla brevis	2
			Utaperla	9
		Perlidae	Paragnetina kansensis	3
			Paragnetina media	5
			Perlidae	2
		Taeniopterygidae	Oemopteryx complex	1
			Taeniopterygidae	2
			Taeniopteryx	2
	Trichoptera	Glossosomatidae	Glossosoma	2
		Hydropsychidae	Cheumatopsyche	19
			Hydropsyche	9
			Hydropsychidae	2
		Lepidostomatidae	Lepidostoma	10
			Lepidostomatidae	1
			Theliopsyche	1
		Philopotamidae	Chimarra	3
			Dolophilodes	2

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Holly Creek						
66g-6	Yes	Coleoptera	Dryopidae	<i>Helichus basalis</i>	1	
			Elmidae	<i>Macronychus glabratus</i>	3	
				<i>Optioservus</i> sp.	11	
				<i>Promoresia elegans</i>	1	
				<i>Stenelmis</i> sp.	7	
				<i>Stenelmis bicarinata</i>	1	
			Psephenidae	<i>Psephenus herricki</i>	14	
			Decapoda	Cambaridae	<i>Procambarus</i> sp.	4
			Diptera	Ceratopogonidae	<i>Bezzia</i> complex	1
				Chironomidae	<i>Apedilum</i> sp.	1
					Chironomidae	3
					<i>Conchapelopia</i> sp.	3
					<i>Cricotopus</i> sp.	1
					<i>Helopelopia</i> sp.	1
					<i>Limnophyes</i> sp.	1
					<i>Micropectra</i> sp.	1
					<i>Microtendipes pedellus</i> grp.	1
		Orthoclaadiinae			2	
		<i>Paracricotopus</i> sp.			3	
		<i>Parakiefferiella B</i>			1	
		<i>Paratanytarsus</i> sp.			1	
		<i>Platysmittia</i> sp.			1	
		<i>Polypedilum aviceps</i>			11	
		<i>Polypedilum flavum</i>			4	
		<i>Polypedilum scalaenum</i>			6	
		<i>Pseudochironomus</i> sp.			1	
		<i>Rheotanytarsus</i> sp.			5	
		<i>Rheotanytarsus A</i>			1	
		<i>Rheotanytarsus pellucidus</i>			1	
		<i>Stempellinella</i> sp.			1	
		<i>Tanytarsus</i> sp.			1	
		<i>Thienemanniella</i> sp.			3	
		<i>Thienemanniella xena</i>	1			
		<i>Tvetenia</i> sp.	1			
		Empididae	<i>Hemerodromia</i> sp.	4		
		Simuliidae	<i>Simulium</i> sp.	4		
		Tabanidae	<i>Tabanus</i> sp.	1		
		Tipulidae	<i>Antocha</i> sp.	3		
			<i>Erioptera</i> sp.	1		
			<i>Hexatoma</i> sp.	2		
		Tipulidae	1			

		Ephemeroptera	Ameletidae	<i>Ameletus</i> sp.	6	
			Baetidae	Baetidae		8
				<i>Baetis</i> sp.	2	
				<i>Baetis brunneicolor</i>	1	
				<i>Baetis intercalaris</i>	1	
				<i>Falliceon</i> sp.	5	
				<i>Pseudocloeon</i> sp.	1	
			Baetiscidae	<i>Baetisca carolina</i>	2	
			Caenidae	<i>Caenis</i> sp.	3	
			Ephemerellidae	<i>Attenella attenuata</i>	1	
			Ephemeridae	<i>Ephemera simulans</i>	1	
				Heptageniidae	<i>Epeorus</i> sp.	1
					<i>Stenonema</i> sp.	8
					<i>Stenonema femoratum</i>	3
			<i>Stenonema sinclairi</i>	3		
		Isorychiidae	<i>Isorychia</i> sp.	3		
		Hemiptera	Veliidae	<i>Rhagovelia obesa</i>	1	
		Megaloptera	Corydalidae	<i>Corydalus cornutus</i>	5	
				<i>Nigronia serricornis</i>	3	
		Odonata	Coenagrionidae	<i>Argia</i> sp.	5	
				<i>Chromagrion conditum</i>	1	
			Gomphidae	<i>Argomphus villosipes</i>	5	
		Plecoptera	Chloroperlidae	<i>Haploperla brevis</i>	3	
			Perlidae	<i>Acroneuria abnormis</i>	4	
				<i>Paragnetina immarginata</i>	3	
		Trichoptera	Hydropsychidae	<i>Ceratopsyche sparna</i>	7	
				<i>Cheumatopsyche</i> sp.	15	
				<i>Hydropsyche decalda</i>	8	
			Philopotamidae	<i>Dolophilodes</i> sp.	1	
			Polycentropodidae	<i>Neureclipsis</i> sp.	1	
				<i>Polycentropus</i> sp.	1	
			Psychomyiidae	<i>Psychomyia flavida</i>	1	
		Rhyacophiliidae	<i>Rhyacophila fuscula</i>	1		
Class: Clitellata			<i>Oligochaeta</i>	4		

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals	
Nimblewill Creek						
66g-23	Yes	Coleoptera	Elmidae	<i>Macronychus glabratus</i>	2	
				<i>Optioservus</i> sp.	9	
				<i>Optioservus ovalis</i>	2	
				<i>Ectopria</i> sp.	2	
				<i>Psephenus herricki</i>	5	
			Psephenidae	<i>Bezzia</i> complex	4	
				<i>Apedilum</i> sp.	12	
				Chironomidae	1	
				<i>Corynoneura</i> sp.	2	
				<i>Cryptochironomus</i> sp.	1	
		Diptera	Ceratopogonidae	<i>Djalmabatista pulcher</i> variant (5 toothed)	1	
				<i>Heterotrissocladius marcidus</i>	1	
				<i>Micropsectra</i> A	4	
				<i>Micropsectra</i> E	1	
				<i>Microtendipes</i> sp.	3	
				Orthocladiinae	2	
				<i>Paracladopelma dons</i>	1	
				Chironomidae	<i>Paralauterborniella nigrohalterale</i>	2
					<i>Paraphaenocladus</i> sp.	1
					<i>Phaenopsectra</i> sp.	1
			<i>Polypedilum</i> sp.		1	
			<i>Polypedilum aviceps</i>		4	
			<i>Pseudorthocladus</i> sp.		2	
			<i>Reomyia</i> sp.		1	
			<i>Stempellinella</i> sp.		11	
			Tanypodinae		1	
			<i>Thienemanniella lobapodema</i>		1	
			<i>Thienemannimyia</i> group sp.	2		
			<i>Xylotopus par</i>	1		
			Dixidae	<i>Dixa</i> sp.	2	
		Simuliidae	<i>Simulium</i> sp.	1		
		Tabanidae	Tabanidae	1		
Tipulidae	<i>Limnophila</i> sp.	1				
	Tipulidae	2				
Ephemeroptera	Baetiscidae	<i>Baetisca carolina</i>	1			
	Ephemerellidae	<i>Attenella attenuata</i>	1			
		<i>Dannella</i> sp.	6			
		<i>Dannella lita</i>	1			
<i>Ephemerella</i> sp.	2					

			<i>Ephemerella argo</i>	4
			Ephemerellidae	3
			<i>Eurylophella donis</i> complex	2
		Ephemeridae	<i>Ephemera</i> sp.	2
		Heptageniidae	<i>Epeorus</i> sp.	2
			<i>Epeorus dispar</i>	7
			<i>Epeorus pleuralis</i>	4
			Heptageniidae	1
			<i>Stenonema</i> sp.	21
		Leptophlebiidae	<i>Habrophlebiodes</i> sp.	1
			Leptophlebiidae	7
Hemiptera		Veliidae	<i>Rhagovelia obesa</i>	1
Odonata		Calopterygidae	<i>Hetaerina</i> sp.	2
		Cordulegastridae	<i>Cordulegaster</i> sp.	2
		Gomphidae	<i>Dromogomphus</i> <i>spinosus</i>	2
			Gomphidae	4
Plecoptera		Capniidae	<i>Allocapnia</i> sp.	7
			Capniidae	3
		Peltoperlidae	<i>Tallaperla</i> sp.	1
		Perlidae	<i>Acroneuria</i> <i>abnormis</i>	4
			<i>Attaneuria ruralis</i>	1
			<i>Paragnetina</i> <i>immarginata</i>	1
		Periodidae	<i>Isoperla similis</i>	1
			Periodidae	1
			<i>Yugus annus</i>	1
		Taeniopterygidae	<i>Oemopteryx</i> complex	1
			<i>Taeniopteryx</i> sp.	4
Trichoptera		Hydropsychidae	<i>Cheumatopsyche</i> sp.	7
			<i>Hydropsyche</i> sp.	5
			Hydropsychidae	1
		Hydroptilidae	Hydroptilidae	1
		Limnephilidae	<i>Hydatophylax</i> <i>argus</i>	4
			Limnephilidae	2
			<i>Pycnopsyche</i> sp.	5
		Philopotamidae	<i>Dolophilodes</i> sp.	4
		Polycentropodidae	<i>Neureclipsis</i> sp.	18
		Psychomyiidae	<i>Lype diversa</i>	1
		Class: Clitellata	Oligochaeta	3

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals			
Polecat Branch								
66g-30	No	Basommatophora	Physidae	Physidae	1			
		Coleoptera	Elmidae	<i>Dubiraphia</i> sp.	1			
				<i>Optioservus</i> sp.	3			
				Cambarinae	1			
		Decapoda	Cambaridae	Cambaridae	2			
		Diptera	Ceratopogonidae	Chironomidae	<i>Ablabesmyia mallochi</i>	1		
					<i>Brillia</i> sp.	1		
					<i>Brillia flavifrons</i>	1		
					<i>Chironomus</i> sp.	10		
					<i>Corynoneura</i> sp.	5		
					<i>Cryptochironomus</i> sp.	2		
					<i>Diamesa</i> sp.	4		
					<i>Eukiefferiella</i> sp.	5		
					<i>Eukiefferiella brehmi</i> group	8		
					<i>Microtendipes pedellus</i> grp.	1		
					<i>Microtendipes rydalensis</i>	1		
					<i>Nanocladius</i> sp.	1		
					<i>Odontomesa fulva</i>	3		
					<i>Orthocladus obumbratus</i>	5		
					<i>Parametrioctenemus</i> sp.	12		
					<i>Phaenopsectra obediens</i> grp.	7		
					<i>Phaenopsectra/Tribelos</i> complex	1		
					<i>Polypedilum flavum</i>	1		
					<i>Polypedilum laetum</i>	1		
					<i>Polypedilum scalaenum</i>	4		
					<i>Potthastia longimana</i>	2		
					<i>Rheotanytarsus exiguus</i> group	3		
					<i>Thienemanniella</i> sp.	1		
					<i>Thienemannimyia</i> group sp.	13		
					<i>Tribelos jucundus</i>	1		
					Dixidae	Dixa sp.	1	
					Simuliidae	<i>Prosimulium</i> sp.	2	
						<i>Simulium</i> sp.	1	
					Tipulidae	<i>Antocha</i> sp.	2	
						<i>Leptotarsus</i> sp.	1	
					Ephemeroptera	Baetidae	<i>Centropitulum</i> sp.	4
						Heptageniidae	Heptageniidae	3

			<i>Stenonema modestum</i>	32
	Megaloptera	Corydalidae	<i>Corydalis comutus</i>	1
	Odonata	Gomphidae	Gomphidae	1
	Plecoptera	Nemouridae	<i>Shipsa rotunda</i>	1
	Trichoptera	Hydropsychidae	<i>Cheumatopsyche</i> sp.	55
			<i>Hydropsyche betteri/depravata</i> complex	4
		Limnephilidae	Limnephilidae	1
	Veneroida	Pisidiidae	<i>Pisidium compressum</i>	1
	Class: Clitellata		Oligochaeta	15

Sub-core region / Station ID	Ref.	Order	Family	Final Identification	Individuals
Sharp Mountain Creek					
66g-31	No	Coleoptera	Elmidae	<i>Dubiraphia</i> sp.	1
				Elmidae	1
				<i>Gonielmis dietrichi</i>	1
				<i>Macronychus glabratus</i>	6
				<i>Optioservus</i> sp.	15
				<i>Ablabesmyia</i> sp.	1
				<i>Ablabesmyia mallochi</i>	3
				<i>Brillia</i> sp.	2
				<i>Eukiefferella brehmi</i> group	8
				<i>Orthocladus obumbratus</i>	1
				<i>Paracladopelma undine</i>	1
				<i>Parakiefferella</i> sp.	1
		<i>Parakiefferella B</i>	1		
		<i>Phaenopsectra punctipes</i> grp.	1		
		<i>Polypedilum A</i>	1		
		<i>Polypedilum flavum</i>	2		
		<i>Potthastia</i> sp.	1		
		<i>Potthastia longimana</i>	3		
		<i>Rheotanytarsus</i> sp.	1		
		<i>Rheotanytarsus exiguus</i> group	5		
		<i>Rheotanytarsus pellucidus</i>	1		
		<i>Tanytarsus M</i>	1		
		<i>Thienemannimyia</i> group sp.	2		
		<i>Tribelos jucundus</i>	1		
		Empididae	<i>Hemerodromia</i> sp.	2	
		Simuliidae	<i>Prosimulium</i> sp.	1	
			<i>Simulium</i> sp.	3	
		Tipulidae	<i>Leptotarsus</i> sp.	1	
		Ephemeroptera	Ephemerellidae	<i>Ephemerella argo</i>	57
			Heptageniidae	<i>Stenonema modestum</i>	11
			Isonychiidae	<i>Isonychia</i> sp.	9
		Neotaenioglossa	Pleuroceridae	<i>Elimia</i> sp.	1
		Plecoptera	Perlodidae	<i>Isoperla clio</i>	1
				<i>Isoperla lata</i>	17
				Perlodidae	1
			Taeniopterygidae	<i>Oemopteryx</i> complex	26
Trichoptera	Brachycentridae	<i>Brachycentrus</i> sp.	1		
	Hydropsychidae	<i>Ceratopsyche sparna</i>	2		
		<i>Cheumatopsyche</i> sp.	1		
		Hydropsychidae	1		
		<i>Potamyia flava</i>	5		
	Limnephilidae	<i>Pycnopsyche divergens</i>	1		

		Philopotamidae	<i>Dolophilodes</i> sp.	1
		Class: Clitellata	Oligochaeta	2

Sub-core region /Station ID	Ref.	Order	Family	Final Identification	Individuals		
Tributary To Talking Rock							
66g-42	No	Coleoptera	Elmidae	<i>Microcylopeus pusillus</i>	7		
				<i>Optioservus</i> sp.	1		
				<i>Oulimnius latusculus</i>	4		
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	1		
				Ceratopogonidae	3		
				Chironomidae	<i>Ablabesmyia mallochi</i>	2	
			<i>Brillia</i> sp.		1		
			<i>Corynoneura</i> sp.		1		
			<i>Diamesa</i> sp.		1		
			<i>Eukiefferiella brehmi</i> group		4		
			<i>Microtendipes</i> sp.		1		
			<i>Microtendipes pedellus</i> grp.		19		
			<i>Parachaetocladius abnobaeus</i>		3		
			<i>Parametricnemus</i> sp.		22		
			<i>Polypedilum</i> sp.		1		
			<i>Polypedilum aviceps</i>		2		
			<i>Rheocricotopus robacki</i>		2		
			<i>Rheotanytarsus exiguus</i> group		4		
			<i>Stempellinella</i> B		1		
			Tribe Tanytarsini		1		
			<i>Tanytarsus M</i>		2		
			<i>Tanytarsus W</i>		2		
			<i>Thienemanniella xena</i>		4		
			<i>Thienemannimyia</i> group sp.		4		
			<i>Trissopelopia ogemawi</i>		1		
			<i>Tveteria</i> sp.		1		
			<i>Zavrelimyia</i> sp.		1		
			Empididae		<i>Hemerodromia</i> sp.	2	
			Simuliidae		<i>Prosimulium</i> sp.	5	
			Ephemeroptera		Ephemerellidae	<i>Attenella attenuata</i>	2
						<i>Ephemerella</i> sp.	17
				Ephemerellidae		10	
		<i>Eurylophella doris</i> complex		2			
		<i>Serratella</i> sp.		2			
		<i>Epeorus</i> sp.		2			
		<i>Epeorus dispar</i>		1			
<i>Epeorus pleuralis</i>	1						
Heptageniidae	<i>Epeorus</i> sp.	2					
	<i>Epeorus dispar</i>	1					
	<i>Epeorus pleuralis</i>	1					

			Heptageniidae	4
			<i>Stenonema</i> sp.	5
			<i>Stenonema femoratum</i>	1
			<i>Stenonema modestum</i>	2
	Haptotaxida	Lumbricidae	Lumbricidae	1
	Megaloptera	Corydalidae	<i>Corydalus cornutus</i>	4
	Odonata	Calopterygidae	<i>Calopteryx angustipennis</i>	1
	Plecoptera	Chloroperlidae	Chloroperlidae	6
			<i>Haploperla brevis</i>	1
		Nemouridae	Nemouridae	1
		Perlidae	<i>Acroneuria abnormis</i>	1
			Perlidae	1
		Perlodidae	<i>Isoperla</i> sp.	6
			<i>Isoperla clio</i>	2
			<i>Isoperla holochlora</i>	2
			<i>Isoperla marlynia</i>	4
		Taeniopterygidae	<i>Oemopteryx</i> complex	1
	Trichoptera	Hydropsychidae	<i>Ceratopsyche</i> sp.	1
			<i>Ceratopsyche morosa</i>	1
			<i>Cheumatopsyche</i> sp.	3
			Hydropsychidae	1
		Limnephilidae	Limnephilidae	2
		Philopotamidae	<i>Chimarra</i> sp.	5
			<i>Dolophilodes</i> sp.	2
	Polycentropodidae	Polycentropodidae	1	
	Rhyacophilidae	<i>Rhyacophila</i> sp.	5	
		<i>Rhyacophila fuscula</i>	1	
	Class: Clitellata		Oligochaeta	2

Sub-coreregion /Station ID	Ref.	Order	Family	Final Identification	Individuals				
Little Scarecorn Creek									
66g-44	No	Coleoptera	Elmidae	<i>Macronychus glabratus</i>	3				
				<i>Microcylloepus pusillus</i>	1				
				<i>Optioservus</i> sp.	1				
		66g-44	No	Coleoptera	Psephenidae	<i>Psephenus hericki</i>	3		
						Diptera	Chironomidae	<i>Ablabesmyia mallochi</i>	1
								<i>Chaetocladius</i> sp.	1
				<i>Eukiefferiella brehmi</i> group	12				
				<i>Labrundinia pilosella</i>	1				
				<i>Micropsectra</i> D	1				
				Orthoclaadiinae	1				
				<i>Orthocladus obumbratus</i>	3				
				<i>Parakiefferiella</i> B	2				
				<i>Parakiefferiella</i> F	2				
				<i>Parametricnemus</i> sp.	9				
				<i>Polypedilum flavum</i>	3				
				<i>Pothastia longimana</i>	3				
				<i>Rheocricotopus</i> sp.	1				
				<i>Rheocricotopus robacki</i>	32				
				<i>Rheocricotopus unidentatus</i>	1				
				<i>Rheotanytarsus exiguus</i> group	34				
				<i>Rheotanytarsus pellucidus</i>	12				
				<i>Stenochironomus</i> sp.	1				
				Tribe Tanytarsini	1				
				<i>Tanytarsus</i> P	3				
				<i>Thienemannimyia</i> group sp.	2				
				<i>Tribelos jucundus</i>	1				
				<i>Tvetenia bravarica</i> grp.	3				
				<i>Tvetenia vitracies</i>	2				
				Dixidae	<i>Dixa</i> sp.			1	
				Empididae	<i>Dolichocephala</i> sp.			1	
					<i>Hemerodromia</i> sp.			2	
				Tipulidae	<i>Leptotarsus</i> sp.	1			
					Ephemeroptera	Heptageniidae	<i>Stenonema</i> sp.	15	
				<i>Stenonema modestum</i>			21		
Isonychiidae	<i>Isonychia</i> sp.			6					
	Odonata			Calopterygidae	<i>Calopteryx</i> sp.	2			
Plecoptera					Capniidae	Capniidae	2		
	Nemouridae	Nemouridae	1						
		Perlodidae	<i>Isoperla</i> sp.	1					
<i>Isoperla lata</i>	1								
Trichoptera	Hydropsychidae	<i>Ceratopsyche spama</i>	1						
		<i>Cheumatopsyche</i> sp.	15						
		Hydropsychidae	1						
		<i>Potamyia flava</i>	7						

		Limnephilidae	<i>Pycnopsyche</i> sp.	2
		Class: Clitellata	Oligochaeta	2

Sub-ecoregion /Station ID	Ref.	Order	Family	Final Identification	Individuals
Yellow Creek					
66g-71	No	Coleoptera	Dytiscidae	<i>Hygrobus farctus</i>	1
			Elmidae	<i>Microcyloepus pusillus</i>	2
		<i>Optioservus</i> sp.		2	
		<i>Oulimnius latusculus</i>		1	
		Diptera	Ceratopogonidae	<i>Bezzia</i> complex	1
				<i>Dasyhelea</i> sp.	1
			Chironomidae	<i>Brillia</i> sp.	2
				<i>Brillia flavifrons</i>	1
				Chironominae	1
				<i>Corynoneura</i> sp.	1
				<i>Eukiefferiella brehmi</i> grp.	2
				<i>Microtendipes rydalensis</i>	1
				<i>Nanocladius altemantherae</i>	1
				<i>Parakiefferiella</i> F	1
				<i>Parametrioctenemus</i> sp.	3
				<i>Paratanytarsus</i> sp.	2
				<i>Paratanytarsus dissimilis</i>	1
				<i>Polypedilum aviceps</i>	1
				<i>Polypedilum flavum</i>	2
				<i>Rheotanytarsus</i> sp.	2
				<i>Rheotanytarsus A</i>	4
				<i>Rheotanytarsus exiguus</i> grp.	13
				<i>Stempellinella A</i>	1
				<i>Stenochironomus</i> sp.	2
				Tribe Tanytarsini	1
				<i>Tanytarsus</i> sp.	2
				<i>Tanytarsus M</i>	7
				<i>Tanytarsus W</i>	5
				<i>Thienemanniella</i> sp.	1
			<i>Thienemanniella xena</i>	1	
			<i>Thienemannimyia</i> group sp.	9	
			<i>Trissopelopia ogemawi</i>	1	
			<i>Zavrelimyia thryptica</i>	1	
			Empididae	Empididae	1
				<i>Hemerodromia</i> sp.	3
			Simuliidae	Simuliidae	1
				<i>Simulium</i> sp.	4
		Syrphidae	<i>Neoscia</i> sp.	1	
		Tipulidae	<i>Antocha</i> sp.	1	
			Tipulidae	1	
		Ephemeroptera	Ephemerellidae	<i>Attenella attenuata</i>	1
				<i>Ephemerella argo</i>	2
				Ephemerellidae	1
<i>Eurylophella bicolor</i>	1				
<i>Eurylophella daris</i> complex	1				
Heptageniidae	<i>Stenacron pallidum</i>		1		

			Stenonema	10
			Stenonema modestum	27
			Stenonema terminatum	1
		Isonychiidae	Isonychia	12
Megaloptera		Corydalidae	Corydalus cornutus	1
Odonata		Coenagrionidae	Argia	1
Plecoptera		Chloroperlidae	Chloroperlidae	2
		Nemouridae	Nemouridae	1
		Perlodidae	Isoperla	3
			Isoperla holochlora	4
		Taeniopterygidae	Oemopteryx	3
Trichoptera	Hydropsychidae		Cheumatopsyche	34
			Hydropsyche	1
			Hydropsychidae	3
	Leptoceridae		Oecetis avara	1
			Trienodes tardus	3
			Hydatophylax argus	1
	Limnephilidae		Pycnopsyche	1
			Pycnopsyche guttifera	1
			Chimarra	1
		Psychomyiidae	Lype diversa	2
	Rhyacophiliidae	Rhyacophila	1	
Class: Clitellata			Oligochaeta	5

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