

Biological Assessment of the Middle Patuxent River Watershed, Howard County, Maryland

Spring 2002 Index Period



Middle Patuxent River

Final Report
April, 2003

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ACKNOWLEDGMENT

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The program's Technical Advisory Committee (TAC), assembled by Howard County, to provide support and guidance, included: Howard Saltzman and Angela Morales, Stormwater Management Division (SWMD), Susan Overstreet, Department of Planning and Zoning (DPZ) and Brenda Belensky, Department of Recreation and Parks (DRP), Ron Klauda, (MBSS/DNR), Wayne Davis (USEPA), and Keith Van Ness (Montgomery County Department of Environmental Protection).

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ABSTRACT

Stream biota rely on the quality of physical habitat, hydrology, and water chemistry for their survival and reproduction. Human activities, such as land cover alterations, can affect abiotic stream conditions which, in turn, can influence biotic assemblages. Thus, many biological monitoring and assessment programs use composite biological indicators both as a measure of stream ecological response to land cover conversions, and as an overall descriptor of water resource integrity.

Several indicators (benthic macroinvertebrates, physical habitat quality, sediment particle size distribution, and channel size) were sampled or measured at 30 stream locations in the Middle Patuxent River watershed in Howard County, Maryland during March 2002. Sampling site locations were selected at random and were pre-stratified by subwatershed (Upper, Middle, and Lower) and stream order, so that 10 sites were selected in each subwatershed. Benthic macroinvertebrates were collected using Maryland Biological Stream Survey (MBSS) methods (multihabitat, 20-jab).

This report presents the sampling and assessment results for all three subwatersheds of the Middle Patuxent. Composite assessments are presented for watershed-scale biological and habitat assessments. The report also presents individual site by site assessments. Watershed comparisons were also made between the 2001 and 2002 results.

TABLE OF CONTENTS

ACKNOWLEDGMENT iii

ABSTRACT v

LIST OF TABLES ix

LIST OF FIGURES ix

LIST OF ACRONYMS x

EXECUTIVE SUMMARY xii

I. PROGRAM OVERVIEW 1

 A. Introduction 3

 1. Background 3

 2. Purpose of Biology and Habitat Assessment 3

 3. Participating Agencies 4

 B. Methods 5

 1. Network Design 5

 a. Summary of Sampling Design 5

 b. Site Selection 5

 2. Field Sampling and Laboratory Processing 6

 a. Benthic Sampling and Processing 6

 b. Benthic Taxonomy 7

 c. Physical Habitat (Methods for Calculation and Scoring) 8

 d. Water Quality 10

 e. Modified Wolman Pebble Count 10

 f. Channel Cross-Section 10

 g. Inability to Sample Stream Sites 11

 3. Data Analysis 11

 a. Data Structure 11

 b. Biological Index Rating (Methods for Calculation and Scoring) 11

 c. Watershed Assessments 13

 4. Quality Assurance/Quality Control 14

II. SUBWATERSHED SITE ASSESSMENTS 19

 A. Middle Patuxent River 21

 1. Watershed Assessment 21

 B. Subwatershed Results 22

 1. Lower Middle Patuxent 22

 a. Data Overview 22

 b. Site Specific Results 24

 2. Middle Middle Patuxent 26

 a. Data Overview 26

 b. Site Specific Results 28

3. Upper Middle Patuxent	31
a. Data Overview	31
b. Site Specific Results	31
C. Watershed Comparisons	34
III. CONCLUSIONS AND RECOMMENDATIONS	38
A. Future Monitoring and Diagnostic Analysis	40
B. Protection and Rehabilitation	41
C. Public Outreach	41
D. Comparability with State Methods	42
E. Quality Assurance/Quality Control (QA/QC)	42
IV. LITERATURE CITED	43
V. APPENDICES	48
Appendix A Benthic Macroinvertebrate Taxa List	
Appendix B Biological Metrics	
Appendix C Field Audit Reports	
Appendix D Physical Habitat Metrics	
Appendix E Station Locations	
Appendix F Wolman Pebble Count	
Appendix G Water Chemistry	

LIST OF TABLES

Table 1 Howard County sampling schedule by watershed 7
Table 2 Total habitat scores as a percentage 9
Table 3 Metric scoring criteria for the Benthic IBI 13
Table 4 Benthic IBI score ranges and corresponding narrative ratings 13
Table 5 The following table lists the taxonomic references 16
Table 6 Relative Percent Difference (RPD) calculations of biological 17
Table 7 Relative Percent Difference (RPD) calculations of physical habitat 17
Table 8 Means of the biological and physical habitat scores 21
Table 9 Lower Middle Patuxent subwatershed summary 23
Table 10 Middle Middle Patuxent subwatershed summary 28
Table 11 Upper Middle Patuxent subwatershed summary 32

LIST OF FIGURES

Figure 1 Five classes of environmental quality 4
Figure 2 Watersheds sampled in the 2002 Spring Index Period 6
Figure 3 Sites sampled in relation to Maryland and major highways 8
Figure 4 Benthic IBI and physical habitat ratings in the Middle Patuxent 22
Figure 5 Lower Middle Patuxent subwatershed 23
Figure 6 Middle Middle Patuxent subwatershed 27
Figure 7 Upper Middle Patuxent subwatershed 32
Figure 8 Managed land use percent vs. biological conditions 35
Figure 9 Benthic IBI scores and physical habitat ratings in Cattail Creek and Brighton Dam subwatersheds 36
Figure 10 Benthic IBI scores and physical habitat ratings in the Little Patuxent River subwatershed 37

ACRONYMS

ARC	Aquatic Resources Center
B-IBI	Benthic Index of Biotic Integrity
BMP	Best Management Practice
BRF	Biological Research Facility
DQO	Data Quality Objectives
DNR	Department of Natural Resources
DPW	Department of Public Works
DPZ	Department of Planning and Zoning
DRP	Department of Recreation and Parks
EDAS	Ecological Data Application System
EPT	Ephemeroptera, Plecoptera, Trichoptera
FLD	Field
MBSS	Maryland Biological Stream Survey
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RBP	Rapid Biological Protocols
RPD	Relative Percent Difference
SD	Standard Deviation
SOP	Standard Operating Procedure
SWMD	Stormwater Management Division
TAC	Technical Advisory Committee
TCR	Taxonomic Certainty Rating
USEPA	United States Environmental Protection Agency
UT	Unnamed Tributary
WRD	Watershed Restoration Division

EXECUTIVE SUMMARY

In 2001, the Howard County Department of Public Works (DPW) Stormwater Management Division (SWMD) initiated biological monitoring for its streams and wadeable rivers on an annual, rotating basin cycle. The primary goal of this program is to assess the current status of the County's streams and watersheds and to establish a baseline for comparing future assessments. The program is designed to provide assessments at three geographic scales: stream-specific, watershed wide; and, after the three-year sampling rotation is complete, county-wide. The Howard County biomonitoring program was designed to be comparable with the statewide Maryland Biological Stream Survey (MBSS). Comparability allows a greater density of sampling locations with consistent interpretation. The Little Patuxent River, Cattail Creek, and Brighton Dam watersheds were sampled in 2001. This report presents results of 2002 assessment in the Middle Patuxent River watershed was sampled during the 2002 Spring Index Period. Sampling methods were identical to those used by the MBSS: benthic macroinvertebrates sampled using a D-frame net in multiple habitats (20-jab method), visual-based assessment of physical habitat quality, and selected field chemistry measurements. In addition to the MBSS protocols, substrate particle size distribution and stream channel cross sectional area were also evaluated. Biological condition scores were derived using the MBSS's Benthic Index of Biotic Integrity (B-IBI). The B-IBI was used to rate the biological condition of each site as good, fair, poor, or very poor. Assessment of physical habitat quality combined MBSS methods and USEPA's Rapid Bioassessment Protocols (RBP). A rating scale based on the latter was assigned to each stream, and used categories of: comparable, supporting, partially supporting, or non-supporting. MBSS measures were taken for additional information. Results of the study will be used for developing protection/restoration priorities. The public will be able to access the yearly report via the County website, as well as through brochures highlighting specific watersheds.

All three subwatersheds received a "fair" biological quality rating and a "non supporting" physical habitat assessment. Predominant sources of stressors seemed to be agriculture, transportation corridors, and the creation of housing developments. Two of the streams from the sampling plan of the Upper Middle Patuxent subwatershed were dry, most likely due to the recent regional drought.

I. PROGRAM OVERVIEW

INTRODUCTION

Background

The Howard County Stormwater Management Division (SWMD) began a multi-year, rotating basin sampling effort to assess the ecological condition of streams and watersheds across the county in 2001. That year, the Little Patuxent River, Cattail Creek, and Upper and Lower Brighton Dam subwatersheds were assessed, followed by the Middle Patuxent River basin in 2002. This report presents the sampling and assessment results from Upper, Middle, and Lower subwatersheds of the Middle Patuxent River basin.

Streams in Howard County are tributaries of the Patuxent and Patapsco Rivers (Figure 3). Since streams of all sizes function as components of larger watershed systems (Vannote et al. 1980, Frissell et al. 1986, Pringle et al. 1988, Power et al. 1988), monitoring conditions in the county will also contribute to an understanding of ecological conditions across the state. Moreover, as the Patuxent and Patapsco drain into the Chesapeake Bay, if we uncover the conditions of smaller streams leading into both rivers, we also gain some understanding of conditions contributing to the Chesapeake Bay.

The principal indicator of stream health is based on the structure and function of the aquatic biota, since they are dependent on instream physical, chemical, and hydrologic characteristics. Thus, ecological condition can be measured through direct sampling and analysis of resident instream biota (Karr et al. 1986, Stribling et al. 1998, Barbour et al. 1999). As instream conditions change due to human activities (land cover conversions, erosive and contaminated stormwater discharges, destruction of riparian vegetation, landscape and in-channel erosion, and others), in response, so will the biota.

The primary goals of the County biomonitoring program are to assess the ecological status of Howard County streams and watersheds, and to establish a baseline for comparing future assessments. Results will also be related to potential programmatic activities, such as BMP siting, installation, and evaluation (Stribling et al. 2001); stormwater discharge permits; contributing to restorations initiatives (such as DNR's watershed restoration action strategy [WRAS]); and guidelines for low impact development [LID] (PG County 2000).

Purpose of Biological and Physical Habitat Assessment

Physical habitat quality was also assessed at each sampling location (Barbour et al. 1999), and reflects the potential of the stream to support a vigorous biota and to maintain normal hydrogeomorphic function. As land use/land cover conversions occur in a watershed, there are changes in stream and watershed hydrology that cause acceleration of stream channel erosion. Impacts on physical habitat through increased farming operations, housing density, and other

urban-suburban developments cause sedimentation, degradation of riparian vegetation, and bank instability, leading to reduced overall habitat quality (Richards et al. 1996).

Although habitat alteration can lead to a diminished capacity of a stream to support certain aquatic organisms, many other factors also affect the biological quality of any stream or watershed (Figure 1). Degraded habitat quality, interruption of natural hydrologic regimes, alterations in food/energy sources and water quality, and unnatural biological interactions cause the biological condition of a stream to worsen (Karr et al. 1986). Potential stressors that cause this type of degradation include nutrient enrichment, toxic spills, flood control engineering, temperature extremes due to depletion of riparian zones or effluent discharge, elevated levels of suspended sediment due to animals access, clearing of riparian areas, construction runoff, etc. Sources of these stressors exist throughout Howard County. However, although biological monitoring is a critical tool for detecting impairment, it can not identify specific causal relationships between stressors and stressor sources (Cormier et al. 2000). This report reflects the current biological and physical habitat condition of the Middle Patuxent River watershed, and provides potential reasons for those conditions.

Participating Agencies

Membership on the County’s Technical Advisory Committee (TAC) included Howard County Government (Stormwater Management Division (SWMD), Department of Recreation and Parks (DRP), and Department of Planning and Zoning (DPZ)), the State of Maryland Department of Natural Resources Biological Stream Survey (MBSS), Montgomery County Department of

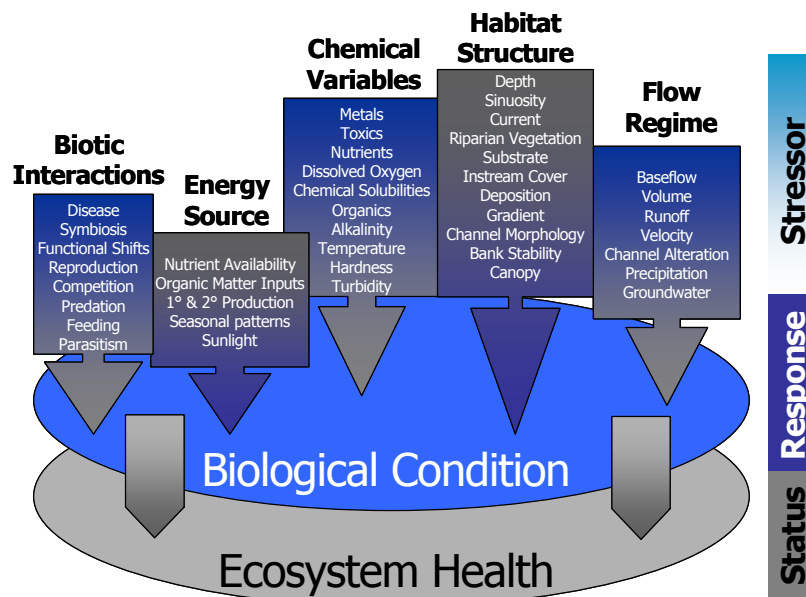


Figure 1. Five classes of environmental variables that affect water resource integrity and overall biological condition (modified from Karr et al. 1999).

Environmental Protection (DEP), and representatives from USEPA. Selected TAC members (Howard County SWMD, DPZ, DRP; MBSS) reviewed the first draft of this report, and provided comments that were integrated into the final report.

METHODS

Network Design

Summary of Sampling Design

The measurement and data quality objectives (MQOs and DQOs) on which the Howard County biological monitoring program is based can be found in the *Quality Assurance Project Plan (QAPP) for Howard County Biological Monitoring and Assessment Program* (DPW 2001). The overall sampling design was developed to be directly comparable to the MBSS, and to allow the eventual sharing of data assessment among agencies. The program is designed so that 10 sites in three subwatersheds per year are sampled ($n = 30/\text{year}$). A total of 15 subwatersheds will be sampled during a span of three years. Specific details of the sampling design can be found in *Design of the Biological Monitoring and Assessment Program for Howard County Maryland* (Pavlik et al. 2001). Spatial allocation of the sampling segments was based on random selection within Strahler (1957) stream orders. The number of sampling segments within each of the first through fourth order channel distances (m) was proportional to total stream length. Thus, final selection and placement of sampling segments was random, and stratified by subwatershed and stream order.

To address issues of measurement error (= systematic error), duplicate (repeated) biological samples were taken at 10% of the overall number of sites. Sites where this repeat sampling occurred were chosen at random, before the sampling event took place.

Site Selection

In 2001, six subwatersheds were sampled: Upper and Lower Brighton Dam and Cattail Creek (Howard County) as well as the Upper, Middle, and Lower Little Patuxent (DNR/Watershed Restoration Division (WRD)). The sites sampled by WRD were completed as part of the statewide Watershed Restoration Action Strategy (WRAS) cooperative. The remaining nine subwatersheds were randomly selected, three more during the second year (Figure 2), six in the third year (Table 1). In year 2002, 10 additional primary and 10 secondary (alternate) sites were chosen in the three subwatersheds of the Middle Patuxent River watershed (Upper, Middle, and Lower). Ten percent of the sites in each watershed were randomly selected as quality control (QC) sites, and one additional sample (biology, chemistry, and habitat) was at each QC site. Figure 3 shows the location of all of the sites sampled in year two.

Field Sampling and Laboratory Processing

One two-person field team completed all sampling during the Spring 2002 Index Period. Benthic macroinvertebrate sampling and physical habitat assessments were conducted in accordance with the Standard Operating Procedures (SOP FLD003/09.07.00; FLD005/02.27.01) contained within the Quality Assurance Project Plan (QAPP) (DPW 2001), as well as methods explained in the

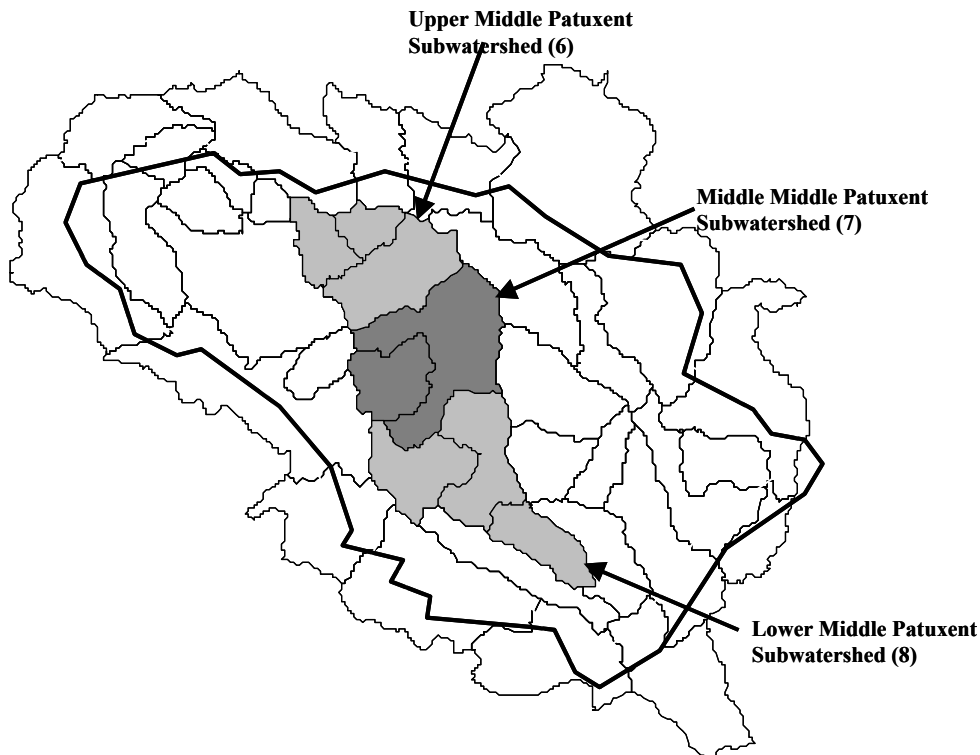


Figure 2. Howard County, Maryland. Watersheds sampled as part of the 2002 Spring Index Period. Numbers in parentheses correlate to the subwatershed numbers in Table 2.

MBSS Sampling Manual (Kazyak 2000). Field chemistry sampling, modified Wolman pebble count, and channel cross sections in the Middle Patuxent River watershed were conducted according to SOPs BRF050/07.07.97, FLD032/01.25.99, and FLD043/07.19.99, respectively.

Benthic Sampling and Processing

At each site, benthic macroinvertebrates were collected from a 75 m reach by sampling approximately 20 ft² of surface area with a D-frame net (595 μ mesh), in proportion to the frequency of habitat types (riffles, snags, vegetated banks, sandy bottom) found within the reach. All sampled material (including leaf litter, small woody debris, and sediment) was composited in a 595 μ sieve bucket, placed in one or more one L sample containers and preserved in 70 - 80% ethanol. Internal and external labels were completed for each container. Samples were tracked

Table 1. Howard County sampling schedule by watershed. WRD indicates that field sampling and laboratory processing of benthic samples was performed by DNR Watershed Restoration Division.

Year	Watershed Name or Surrogate	Subwatershed #	Primary Sampling Unit (PSU)
1 (2001)	Little Patuxent River	11	Upper Little Patuxent (10 sites, WRD)
		12	Mid Little Patuxent (10 sites, WRD)
		13	Lower Little Patuxent (10 sites, WRD)
	Brighton Dam	2	Upper Brighton Dam (10 sites)
		5	Lower Brighton Dam (10 sites)
	Cattail Creek	3	Cattail Creek (10 sites)
2 (2002)	Middle Patuxent River	6	Upper Middle Patuxent (10 sites)
		7	Mid Middle Patuxent (10 sites)
		8	Lower Middle Patuxent (10 sites)
3 (2003)	Boundary Tributaries	10	S Branch Patapsco R Tribs (10 sites)
		1	Patapsco River L Br A (10 sites)
		4	Patapsco River L Br B (10 sites)
	Little Patuxent River	14	Hammond Branch (10 sites)
		15	Dorsey Run (10 sites)
		9	Rocky Gorge Dam (10 sites)

on chain-of-custody forms for each subwatershed. In the lab, the composited samples were randomly subsampled to approximately 100 organisms and identified to genus level (Howard County DPW/SWMD 2001, Boward and Friedman 2000).

Benthic Taxonomy

Benthic macroinvertebrates were usually identified to the genus level. In some cases, e.g., when individuals were of early instars or had damaged or missing diagnostic morphological features, identification was restricted to a higher taxonomic level, such as family. All identifications were performed by ARC, College Grove, Tennessee (R. D. Kathmann, principal). Taxonomic data were received in Excel spreadsheets and were loaded into the Ecological Data Application System, Version 3.0 (EDAS; Tetra Tech 1999). Functional feeding group, habit, and tolerance value designations were assigned to each taxon according to Meritt and Cummins (1996), Barbour et al. (1999), and Stribling et al. (1998). Tolerance of a taxon is based on its ability to survive short and long term exposure to physicochemical stressors that result from chemical pollution, hydrologic alteration, or habitat degradation (Stribling et al. 1998). Following Hilsenhoff's basic framework (1982), tolerance values were assigned to individual taxa on a scale of 0-10, with zero identifying those taxa with greatest sensitivity (least tolerance) to stressors, and 10, those taxa with the least sensitivity (greatest tolerance) to stressors.

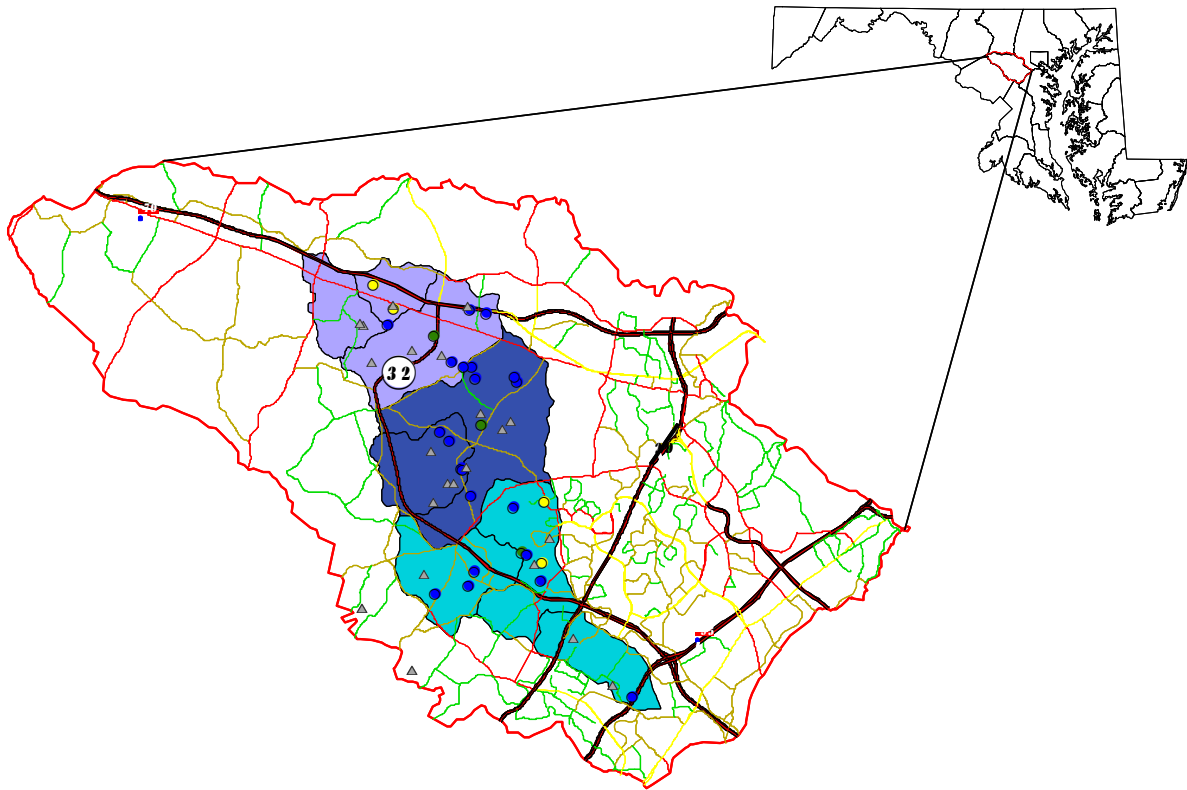


Figure 3. Sites sampled in 2002. Circles indicate Howard County sites, triangles indicated MBSS sites.

Physical Habitat Rating (Methods for Calculation and Scoring)

As outlined in the QAPP (DPW 2001), 10 parameters describing physical habitat quality and stability were visually assessed at each site. These parameters were ranked as optimal, suboptimal, marginal, or poor based on a 20-point scale, with 20 being the best possible (optimal) conditions and zero representing the worst (poor) conditions. A reference database, and thus, a degraded/non-degraded threshold has not been developed by the MBSS to allow direct comparison to physical habitat characteristics. Moreover, MBSS records any qualitative physical habitat measurements during the Summer Index Period, while sampling fish. Currently, Howard County does not support summer time fish and habitat sampling. For these reasons, the non-Coastal plain categories found in the Rapid Bioassessment Protocols (RBPs; Barbour et al. 1999) were used. However, since the RBPs were not used to rate reference sites, the values were summed and compared to the maximum possible score (200) for overall percent comparability for each site. The following 10 parameters were evaluated:

1. *Epifaunal substrate/available cover*. Includes the relative quantity and variety of natural structures in the stream, such as cobble (riffles), large rocks, fallen trees, logs and branches, and undercut banks, available as refuge, feeding, or sites for spawning and nursery functions of aquatic macrofauna.
2. *Embeddedness*. Refers to the extent to which rocks (gravel, cobble, and boulders) and snags are covered or sunken into the silt, or mud of the stream bottom.
3. *Velocity/depth regime*. The occurrence of flow patterns relates to the stream's ability to provide and maintain a stable aquatic environment.
4. *Sediment deposition*. Measures the amount of sediment that has accumulated in pools and the changes that have occurred to the stream bottom as a result of deposition.
5. *Channel flow status*. The degree to which a stream is filled with water.
6. *Channel alteration*. Measures large-scale (usually anthropogenic) changes in the shape of the stream channel.
7. *Frequency of riffles/bends*. Measures the heterogeneity occurring in a stream. Riffles are a source of high-quality habitat and diverse fauna. Therefore, increased frequency of occurrence greatly enhances the diversity of the stream community.
8. *Bank stability*. Measures whether the stream banks are eroded (or have potential for erosion).
9. *Vegetative protection*. Measures the amount of vegetative protection afforded to the stream bank and the near-stream portion of the riparian zone.
10. *Riparian vegetative zone width*. Measures the width of natural vegetation from the edge of the stream bank out through the riparian zone.

Parameters 8-10 evaluate each bank separately. The range of scores for each bank is 0 (poor) to 10 (optimal). Left and right banks were determined looking downstream. Example habitat forms can be found in the QAPP (SOP FLD005/02.27.01). Table 2 provides narrative ratings that correspond to physical habitat quality scores. These scores express the potential of a stream or watershed to support a healthy biological community. Percentages and their narrative ratings were adapted from Plafkin et al. (1989).

Table 2. Total habitat scores as a percentage of maximum possible and corresponding ratings.

% of Maximum	Narrative Habitat Rating	Definition
> 90.0	Comparable	Capable of maintaining biological conditions similar to reference streams
75.1 - 89.9	Supporting	Habitat of somewhat reduced condition, but often can support reference quality biology
60.1 - 75.0	Partially Supporting	Capable of supporting biological conditions of lower quality than reference conditions
< 60.0	Non-Supporting	Not able to maintain healthy biological conditions

Habitat forms developed by MBSS were also filled out at each site in all three subwatersheds. These sheets evaluated land use/land cover designations, occurrence/severity of refuse, buffer breaks (storm drains, roads, pastures, etc.), and channelization. Information from these forms is described in the narrative watershed and site-by-site assessment sections of this report.

Water Quality

Conductivity, dissolved oxygen, pH, and temperature were measured at each site using a Hydrolab Surveyor 4a (SOP BRF050/07.07.97). This instrument was calibrated for each parameter at the start of each sampling day, and the readings were recorded on a calibration log sheet.

Modified Wolman Pebble Count

In addition to the qualitative habitat assessment, this physical habitat feature was measured for all stream sites in the Middle Patuxent watershed. While not a part of the MBSS protocols, the County performed pebble counts to obtain more specific data on stream substrates. Ten transects were proportionally distributed (approximately one every 7.5 m) through the assessment segment beginning on each bank at approximate bankfull level and spanning the width of the active channel. A total of 10 particles per transect were selected by hand (each particle is defined as a size of geologic substrate material within various classes: silt/clay, sand, gravel, cobble, boulder, and bedrock). Each particle was chosen, measured, and recorded at evenly spaced intervals across the channel. To reduce sampler bias, each particle was chosen without the sampler looking in the stream at what was being collected (DPW 2001, SOP FLD 032/01.25.99; Harrelson et al. 1994). Calipers and a sand card were used for particle measurement.

Channel Cross-Section

Although not measured by MBSS, the County includes this measurement to provide a coarse characterization of channel cross-sectional area and changes to channel volume over time. After a thorough visual assessment of the channel characteristics, a representative section was selected for analysis as the cross-section area. A tape measure is drawn between monuments that are set on each bank. The monuments are bank pins, that are temporarily inserted into the ground, in order to keep the tape measure taut during measurement, to ensure accurate height/width values. Height measurements are taken using a laser-level and survey rod. The measurements are taken across the entire width of the channel, at transitional areas along the bank and streambed (e.g., bankfull and thalweg). This procedure is outlined in detail in SOP FLD043/07.19.99 (DPW 2001).

Inability to Sample Stream Sites

Ten primary sampling sites were randomly chosen for each subwatershed. In addition to the primary sites, ten secondary, or replacement, sites were randomly chosen for each subwatershed to provide backup locations in the event that the primary sampling site was deemed unsampleable (i.e., landowner denied access, no channel remaining [filled in] or, channel too deep). Two primary sites in the Middle Patuxent River watershed were replaced with secondary sites because the channel no longer existed (i.e., filled with dirt, grass, etc.). Two sites in the Upper Patuxent subwatershed were could not be sampled for invertebrates because they were dry. However, habitat assessments were still performed at these sites and the drought conditions were taken into account in describing the site.

Data Analysis

Data Structure

Benthic macroinvertebrate, physical habitat, and water quality data were entered into EDAS, Version 3.0 (Tetra Tech 1999). This relational database allows for the management of location and other metadata, taxonomic and count data, raw physical habitat scores, the calculation of metric values, physical habitat and water quality rankings, and B-IBI values.

Biological Index Rating (Methods for Calculation and Scoring)

The biological indicator used in this project is based on the Index of Biological Integrity (IBI; Karr et al. 1986) and uses characteristics of the benthic macroinvertebrate and fish assemblage structure and function to assess the overall water resource condition. Benthic and fish IBIs were developed by the Maryland Biological Stream Survey (MBSS) and calibrated for different geographic areas of Maryland (Stribling et al. 1998, Roth et al. 2000).

The benthic metrics used were those selected and calibrated by the MBSS (Stribling et al. 1998) for Maryland non-Coastal plain streams. The nine metrics calculated for each of the benthic macroinvertebrate samples were:

1. *Total number of taxa.* The taxa richness of a community is commonly used as a qualitative measure of stream water and habitat quality. Stream degradation generally causes a decrease in the total number of taxa (Resh and Grodhaus 1983).
2. *Number of EPT taxa.* Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) are generally sensitive to degraded stream conditions. A low number of taxa representing these orders is indicative of stream degradation (Lenat 1988).
3. *Number of Ephemeroptera taxa.* Mayflies are generally sensitive to pollution and the number of mayfly genera represented by individuals in a sample can be an indicator of stream conditions, generally decreasing with increasing stress.

4. *Number of Diptera taxa.* As an order, Dipterans are relatively diverse, as well as variable in their tolerance to stress. Many taxa, especially Chironomidae, have wide distributions and may occur even in highly polluted streams. However, a high diversity of Diptera taxa generally suggests good water and habitat quality.
5. *Percent Ephemeroptera.* The degree to which mayflies dominate the community can indicate the relative success of these generally pollution intolerant individuals in sustaining reproduction. The presence of stresses will reduce the abundance of mayflies relative to other, more tolerant individuals; although, some mayfly groups, such as several genera of the family Baetidae, are known to increase in numbers in cases of nutrient enrichment.
6. *Percent Tanytarsini.* The tribe Tanytarsini is a relatively intolerant group of midges. A high percentage of Tanytarsini, proportional to the overall sample is taken to indicate lower levels of stress. This metric increases with high numbers of Tanytarsini and decreases with high numbers of non-Tanytarsini.
7. *Number of Intolerant Taxa.* Intolerant taxa are the first to be eliminated by perturbations. Often, intolerant taxa are specialists and perturbations can alter or eliminate specialized habitat or water quality requirements. Taxa with tolerance ratings from 0 - 3 were considered intolerant (Hilsenhoff 1987).
8. *Percent Tolerant.* As stressor intensity increases, tolerant individuals (tolerance values 7 - 10) tend to dominate samples. Values for this metric increase in cases of elevated stress. Intolerant individuals become less abundant as stress increases, leading to more opportunity for tolerant taxa to colonize a stream (Hilsenhoff 1987).
9. *Percent Collectors.* Abundance of detritivores, which feed on fine particulate organic matter in deposits, typically decreases with increased disturbance. This ecological response may be highly represented by intolerant taxa.

Each metric was scored on a 5, 3, 1 basis (5 being the best, 1 being the worst) according to stream health. Metric scoring criteria are listed in Table 3. Overall biological index scores are obtained by summing of the nine metric scores for each site, and dividing by the number of metrics (9). Using the format established by MBSS, the resulting value is then compared to the index scoring criteria for translation into narrative categories (Table 4; Stribling et al. 1998). Again, using the MBSS protocol, if the total number of organisms in a sample was less than 60, metrics were not calculated (D. Boward, personal communication). Sites with < 60 organisms were rated as “very poor” unless there was evidence that this represented a natural condition (Stribling et al. 1999).

Table 3. Metric scoring criteria for the Benthic IBI (Stribling et al. 1998).

Benthic Macroinvertebrate Metrics	Criteria		
	5	3	1
Total number of taxa	>22	16 - 22	<16
Number of EPT taxa	>12	5 - 12	<5
Number of Ephemeroptera taxa	>4	2 - 4	<2
Number of Diptera taxa	>9	6 - 9	<6
% Ephemeroptera	>20.3	5.7 - 20.3	<5.7
% Tanytarsini	>4.8	0.0 - 4.8	0.0
Number of intolerant taxa	>8	3 - 8	<3
% tolerant	<11.8	11.8 - 48.0	>48.0
% collectors	>31.0	13.5 - 31.0	<13.5

Table 4. Benthic IBI score ranges and corresponding narrative ratings.

Benthic IBI Score Range	Narrative Biological Rating
4.0 - 5.0	Good
3.0 - 3.9	Fair
2.0 - 2.9	Poor
1.0 - 1.9	Very Poor

Watershed Assessments

In this report, a narrative explanation of the biological condition and physical habitat quality scores are given for each site. Important features recorded during sampling or found during subsampling are used to further illustrate potential reasons for site rating. Tolerance values (t.v.) are used in site descriptions to further explain information about the organisms sampled, and how their tolerance to pollution affects the overall metric score. The mean and standard deviation for benthic macroinvertebrate metrics and physical habitat scores were calculated in MS Excel for each watershed. The “Percent of maximum” values presented in the appendix were calculated by dividing the total habitat score by the total possible score represented on the habitat data sheets

(method maximum), rather than a mean of field measurements or median from a set of reference sites. RBP habitat data sheets have a total possible score of 200.

QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) activities are designed to ensure data quality and document data characteristics. To this end, Howard County has:

- documented standard operating procedures (SOPs) for field sampling, laboratory processing, and completing chain-of-custody forms

The SOPs and procedures for these QC activities are documented in the Howard County Biological Monitoring and Assessment Program plan (DPW 2001). All SOPs are cited in the methods section of this report. Chain-of-custody and sample log sheets were maintained to track the inventory and processing status of all samples. Sample documentation forms are kept in three-ring binders in Tetra Tech's Biological Research Facility (BRF).

- held annual orientation sessions for field sampling

The County field orientation is held as a "refresher" for experienced samplers and as an introduction for new samplers. All two-person field teams are divided into Team Leader and Crew Member. Team Leaders are required to have completed at least one field season as a Crew Member. Crew Members have completed either the introductory or "refresher" field orientation. The orientation for this index period was held on February 19-20, 2002. Part of the first day was devoted to field notes and procedural guidelines. The second day was a hands-on training session at Red Run (in Baltimore County). At least one person from each field crew also attended the MBSS training session conducted by DNR staff, which was held on February 26, 2002, at Morgan Run Natural Environmental Area (Carroll County).

- conducted field audits

The County field crew was visited on-site by an experienced field ecologist who was not involved in the fieldwork for the project. MBSS staff also conducted independent audits of the Howard County field team. Field team procedures were observed for adherence to SOPs and consistency in completion of all data collection requirements including, field data sheets, sample preservation, and photo documentation. Results of field audits can be found in Appendix H. County officials also visited a site to observe the field team's sampling technique.

- repeated continual training and QC checks for sample sorting and subsampling

All sorting and subsampling of samples was performed by a single individual in the Tetra Tech BRF. Early sorting was checked by the laboratory manager and principal project taxonomist to

ensure that there were no missed specimens in removed grid debris. Once a 90% sorting efficiency was attained, random checks were performed on approximately one out of 10 samples.

- made consistent use of up-to-date technical taxonomic literature

The target level of taxonomic identification for benthic macroinvertebrates for this project was genus. State-of-the-science technical literature was used throughout and includes the references listed in Table 5.

- verified taxonomy for questionable invertebrate specimens by senior taxonomists or independent specialists

There are two principal sources of error that can cause uncertainty in some taxonomic identifications. One is that the specimens in question are of very early instars (juvenile) and lack morphological structures necessary for positive identification. Another is that any specimen can have damaged or missing morphological features (gills, antennae, legs, caudal filaments) rendering final, positive identification problematic. In addition, for midges, inadequate mounting medium can make genus level identification nearly impossible.

- created, maintained, and used reference collection and voucher samples

During the first sampling year, Howard County created a taxonomic reference collection for benthic macroinvertebrates collected in the county. One or more specimens removed from samples are kept as representative of the taxonomist's concept of that taxon. These organisms of reference quality collected during the spring 2002 index period were added to the reference collection. As sampling continues, the reference collection will be updated with any new example specimens. Specimens in the reference collection were identified by Aquatic Resources Center (ARC), College Grove, TN (R. Deedee Kathman, Ph.D.). Voucher samples (stored in ~75% ethanol) are kept from all sampling in Howard County for at least three years in the Tetra Tech BRF.

- standardized data entry and management system

All biological, physical habitat, chemical, and ancillary data were entered directly from field data sheets or Excel spreadsheets into EDAS. The data and analytical results from future index periods will be managed in this system.

- conducted independent QC checks of all data entry

One hundred percent of the data set, once entered, was checked by hand against the original, hand-written field sheets. If discrepancies were encountered, they were corrected in EDAS.

Table 5. The following table lists the taxonomic references used for organism identification.

Burch, J. B. 1989. <i>North American Freshwater Snails</i> . Malacological Publ., Hamburg, Michigan. 365p.
Burch, J. B. 1982. <i>Freshwater Snails (Mollusca: Gastropoda) of North America</i> . EPA-600/3-82-026, USEPA, Cincinnati, Ohio. 294 p.
Edmunds, G. F., Jr., Jensen, S. K. and Berner, L. 1976. <i>The Mayflies of North and Central America</i> . Univ. Minn. Press, Minneapolis. 330 p.
Epler, J. H. 1995. <i>Identification Manual for the Larval Chironomidae (Diptera) of Florida</i> . rev. ed. Dept. Environ. Prot., Tallahassee, FL. 9 sections.
Epler, J. H. 1996. <i>Identification Manual for the Water beetles of Florida (Coleoptera: Dryopidae, Dytiscidae, Elmidae, Gyrinidae, Haliplidae, Hydraenidae, Hydrophilidae, Noteridae, Psephenidae, Ptilodactylidae, Scirtidae)</i> . Dept. Environ. Prot., Tallahassee. 15 sections.
Kathman, R. D. and Brinkhurst, R. O. 1998. <i>Guide to the Freshwater Oligochaetes of North America</i> . Aquatic Resources Center, College Grove, TN. 264 p.
McAlpine, J. F., Peterson, B. V., Shewell, G. E., Teskey, H. J., Vockeroth, J. R. and Wood, D. M. (Coords.) 1981. <i>Manual of Nearctic Diptera</i> . Vol. 1, Monogr. 27. Can. Govt. Publ. Centre, Hull, Quebec. 674p.
Merritt, R. W. and Cummins, K. W. 1996. <i>An Introduction to the Aquatic Insects of North America</i> . 3 rd , Edition. Kendall/Hunt Publ. Co., Dubuque, Iowa. 862p.
Needham, J. G. and Westfall, M. J., Jr. 1954. <i>A Manual of the Dragonflies of North America (Anisoptera)</i> . Univ. Calif. Press, Berkeley. 615 p.
Oliver, D. R. and Dillon M. E. 1990. <i>A Catalog of Nearctic Chironomidae</i> . Research Branch, Agriculture Canada. Publ. 1857/B:1-89.
Westfall, M. T., Jr. and May, M. L. 1996. <i>Damselflies of North America</i> . Scientific Publishers, Gainesville, Florida. 649 p.
Wiederholm, T. (ed.) 1983. Chironomidae of the Holarctic region. Keys and diagnoses. Part 1. Larvae. <i>Entomol. Scand. Suppl.</i> 19. 457 p.
Wiederholm, T. (ed.) 1986. Chironomidae of the Holarctic region. Keys and diagnoses. Part 2. Pupae. <i>Entomol. Scand. Suppl.</i> 28. 482 p.
Wiggins, G.B. 1996. <i>Larvae of North American Caddisfly Genera (Trichoptera)</i> , 2nd Ed. University of Toronto Press, Toronto. 457 p.

- collected duplicate samples for estimating precision using Relative Percent Difference (RPD)

Duplicate biological and physical habitat samples were taken at three sites (10% of the total sampled) in the Middle Patuxent River watershed. Comparisons of the differences between the results from these sites provide estimates of the precision of the biological assessments and the consistency of sampling activity. Relative percent difference (RPD) provides an estimate of the difference between sample pairs. Table 6 illustrates RPD for biological metrics and Table 7 presents RPD for physical habitat scores.

Table 6. Relative Percent Difference (RPD) calculations of biological scores for sites in the Middle Patuxent Watershed.

Station #	125	125QC	146	146QC	168	168QC
Location	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Terrapin Branch	Terrapin Branch
Metric Score	2.78	3.00	3.67	3.67	4.33	4.11
Narrative Rating	Poor	Fair	Fair	Fair	Good	Good
Total Organisms	117	103	104	108	99	112
RPD	8%		0		5%	

The measurement performance criteria outlined in the QAPP (DPW 2001) calls for RPD agreement of the overall bioassessment scores to be $\leq 5\%$. Since the metric scores are based on a 1, 3, 5 scale, and not a continuous scale, a change in only one metric category (i.e., one “point”) is enough to alter the overall score above the acceptable limit. The QC sites in the Middle and Upper Middle Patuxent River watersheds meet this criterion. However, the Lower Middle Patuxent River RPD score is 3% over the acceptable limit. Further review of the individual biological metrics revealed that between site 125 and 125QC, only one metric category (% Tanytarsini) varied enough to change the metric score from a 3 to a 5. This could be due to the random selection of the original site, combined with the preselection of the QC site. Since the QC sites are chosen at random, but are still located in the adjacent 75-m upstream reach, obstructions such as a fence or a bridge can alter the scores between probability vs. QC site. Performing the QC bioassessment at an adjoining reach has some potential for differences in habitat availability and organisms sampled.

Table 7. Relative Percent Difference (RPD) calculations of physical habitat scores for sites in the Middle Patuxent Watershed.

Station #	125	125QC	146	146QC	168	168QC
Location	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Terrapin Branch	Terrapin Branch
Total Score	139	116	105	93	113	114
% Compared to Maximum (200)	69.5	58	52.5	46.5	56.5	57
Narrative Rating	Partially Supporting	Non Supporting	Non Supporting	Non Supporting	Non Supporting	Non Supporting
RPD	18%		12%		1%	

The measurement performance criteria outlined in the QAPP (DPW 2001) calls for RPD agreement of the overall physical habitat assessment scores to be $\leq 20\%$. The QC sites in each subwatershed meet this criterion.

- compared sample variation with design assumptions

The standard deviations from the three subwatersheds (following the year 2 biomonitoring schedule) were compared to the standard deviations (SD) associated with MBSS samples

(reference and test) collected in general non-Coastal plain proximity and in Howard County. In the program sampling design (Pavlik et al. 2001), the MBSS values were used to assign a target number (number of sites to sample) per subwatershed to meet specified data quality objectives (DQOs).

- Reference = 0.69
- MBSS Test = 0.83
- Spring 2002 Sampling = 0.47

Since the calculated SD from this dataset is 0.47, and is below the design criteria of 0.69 and 0.83, the DQO is met.

II. SUBWATERSHED SITE ASSESSMENTS

Middle Patuxent River

The Middle Patuxent River watershed is located in the center of Howard County. Its headwaters are in the northern portion of the county, originating primarily in agricultural areas. The river flows through various farms and subdivisions, and the more southern portions (below MD-Rte. 108) are near the Columbia business center, in the Planned Service Area. The main transportation corridors in the watershed are I-70 across the northern section, I-95, and MD-Rtes. 29 in the southern portion, and MD-Rte 32, which runs the length of the watershed. Land use/land cover in the watershed is a mixture of developed areas (e.g., subdivisions, farmland, parking lots, and shopping centers). Although the watershed is on the outskirts of the high density urban areas around Columbia and Ellicott City, it is still affected by the more broadly-spread areas of development. A list of all sites, water body names and sampling locations can be found in Appendix E.

Watershed Assessment

Table 8 provides an overview of mean scores and narrative characterization for each subwatershed. A graphic display of the subwatershed ratings in the Middle Patuxent can be found in Figure 4. Correlations run between total physical habitat score and B-IBI scores (Pearson product moment) produced an r-value of 0.24 (n=28).

Table 8. Means of the biological and physical habitat scores for each subwatershed, with their corresponding narrative ratings. Confidence limits are represented by a single

	Narrative Rating	Index Mean Score
Upper Middle Patuxent		
Physical Habitat Quality	“Non Supporting”	$\bar{x} = 102 \pm 23.47$ (n = 10)
Biological Condition (B-IBI)	“Fair”	$\bar{x} = 3.39 \pm 0.57$ (n = 8)
Middle Middle Patuxent		
Physical Habitat Quality	“Non Supporting”	$\bar{x} = 105.6 \pm 13.22$ (n = 10)
Biological Condition (B-IBI)	“Fair”	$\bar{x} = 3.59 \pm 0.29$ (n = 10)
Lower Middle Patuxent		
Physical Habitat Quality	“Non Supporting”	$\bar{x} = 117.4 \pm 15.31$ (n = 10)
Biological Condition (B-IBI)	“Fair”	$\bar{x} = 3.22 \pm 0.56$ (n = 10)

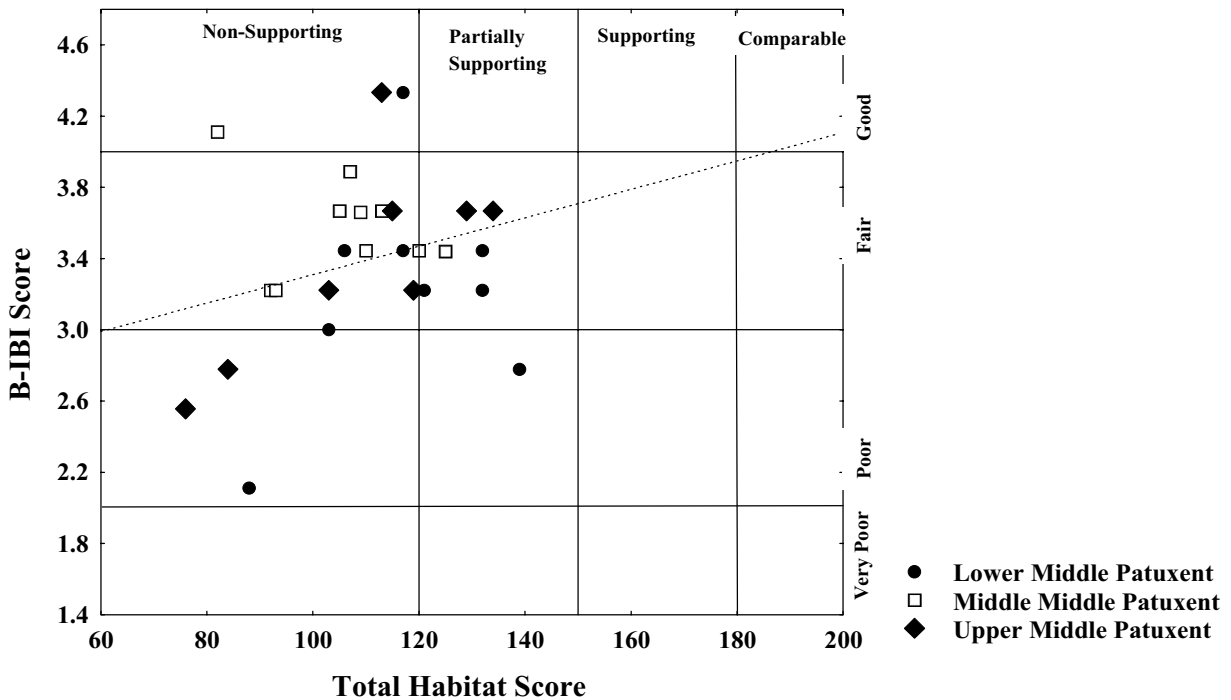


Figure 4. Benthic IBI scores and physical habitat ratings for each site in the Middle Patuxent River.

SUBWATERSHED RESULTS

Lower Middle Patuxent

Data Overview

In this subwatershed, four 1st-order, one 2nd-order, two 3rd-order, and three 4th-order streams were sampled (Figure 5). The mean biological condition for this subwatershed is “fair” ($\bar{x} = 3.22 \pm 0.56$, $n = 10$). One site received a “good” rating, seven were rated “fair”, and two were found to be in “poor” biological condition (Table 9). The mean physical habitat rating in this subwatershed is “non-supporting” (58% of maximum) (Table 9). Of the ten sites sampled, four received “partially-supporting” ratings, while the other six were rated as “non-supporting”. Correlating between physical habitat quality and biological condition had a low r-value of 0.34 (Pearson product moment), suggesting that stressors other than habitat are having a substantial effect on overall biological condition.

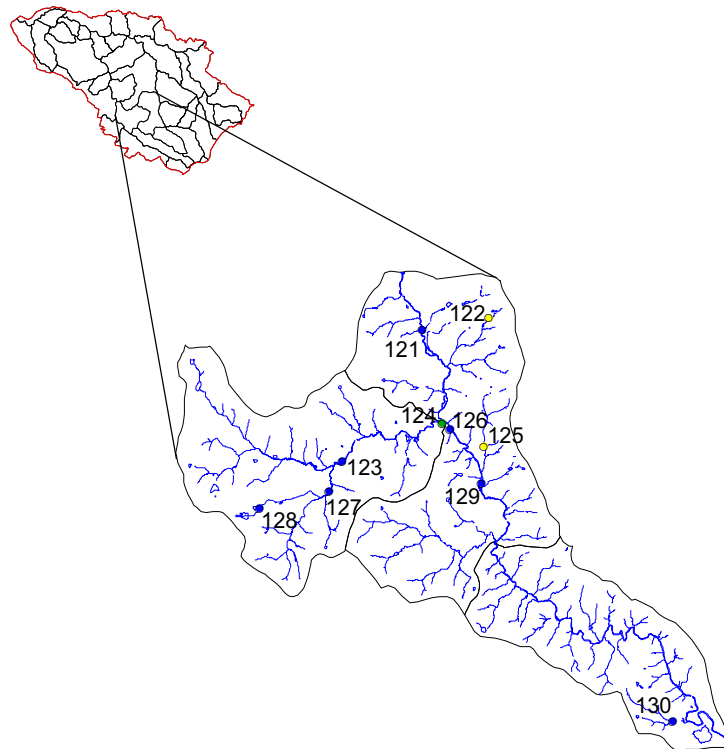


Figure 5. Color-coded biological condition ratings for the Lower Middle Patuxent River subwatershed. Green = good, blue = fair, yellow = poor, red = very poor. 121-129 indicate site numbers.

Table 9. Summary of biological and habitat scores for each sampled site in the Lower Middle Patuxent subwatershed.

Site	Benthic IBI Score	Biological Rating	Habitat Score	Habitat Rating	Stream Order
121	3.44	Fair	117	Non Supporting	4
122	2.11	Poor	88	Non Supporting	1
123	3.44	Fair	132	Partially Supporting	3
124	4.33	Good	117	Non Supporting	3
125	2.78	Poor	139	Partially Supporting	1
126	3.22	Fair	119	Non Supporting	4
127	3.44	Fair	106	Non Supporting	2
128	3.22	Fair	132	Partially Supporting	1
129	3.22	Fair	121	Partially Supporting	4
130	3.00	Fair	103	Non Supporting	1

Site Specific Results

Site 121 - Located off a dirt-path between the 14th and 15th holes of Hobbits Glen Golf Course, this fourth-order stream received a “fair” biological rating (3.44). The subsample contained 115 individual organisms from 36 total taxa. Most metric scores were in the moderate range (3), except for % Tanytarsini (metric value = 6.96%), which received the highest metric score possible (5). The organisms found most often were *Cricotopus* (tolerance value [t.v.] = 7) and *Thienemannimyia* (t.v. = 6); (Diptera: Chironomidae).

Physical habitat was rated “non-supporting” (58.5%). Water from this stream is pumped into a holding pond used for irrigating the golf course. Vegetative protection of the stream bank and bank stability were marginal. Fine sand-silts in the stream limited the preferred habitat of many organisms and caused high embeddedness (50-75%). This stream had the highest percentage of sands (very fine - very coarse) found at any site in the subwatershed (55%).

Site 122 - This 1st-order stream is located off Wilson Bottom Service Road. It received the lowest biological rating (“poor,” 2.11) of any site in this subwatershed. There were no representatives of EPT taxa in the sample. Only 22 taxa were in the subsample, the lowest total for the Lower Middle Patuxent subwatershed. The most common organisms were *Chaetocladius* and *Orthocladius* (Diptera: Chironomidae), both with t.v. = 6.

Physical habitat at this site was rated “non -supporting” (44%). Marginal scores were given in the bank stability, channel flow status, embeddedness, riparian zone, sediment deposition, and vegetative protection categories. This stream may be impacted by construction of a strip-mall upstream, and/or a nearby housing development.

Site 123 - Located off Welcome Night Path, this 3rd-order stream received a “fair” biological rating (3.44). There were 42 total taxa in the sample. This stream exhibited the highest diversity of organisms in the subwatershed. Ten percent of the sample was composed of Ephemeroptera (mayflies), an organism that is sensitive to pollution. However, the most common organisms found were *Cheumatopsyche* (Trichoptera: Hydropsychidae, t.v. = 5) and *Parakiefferiella* (Diptera: Chironomidae, t.v. = 4).

This site received a “partially-supporting” (66%) physical habitat rating. Bank stability, vegetative protection, and embeddedness scored in the high marginal category. The sampling team observed a braiding of the stream channel due to recent sediment deposits. This may be in response to recent construction of a housing development.

Site 124 - This third-order stream received the highest biological rating (good, 4.33) in the Lower Middle Patuxent subwatershed. It is located in the woods off Towering Oak Path. This site had the highest percent Ephemeroptera and EPT taxa metric values in the subwatershed, 22.77% and

15, respectively. This site also had the lowest percentage of pollution tolerant organisms (6.93%).

Physical habitat was rated “non-supporting” (58.5%). The site was located on a bend, near the stream’s confluence with a 4th-order stream. High flows have apparently caused bank erosion, as evidenced in low scores in the sediment deposition and channel flow status categories. The right bank was heavily eroded and received poor bank stability and vegetative protection scores.

Site 125 - This site is located at the bottom of the circle on Harmel Drive. Biological condition at this site was rated “poor” (2.78). It had the highest number of individuals subsampled in this subwatershed (117). However, it also had the highest percentage of pollution tolerant organisms (26.50%) in the subwatershed. *Stegopterna* (Diptera: Simuliidae, t.v. = 7) and *Neophylax* (Trichoptera: Uenoidae, t.v. = 3) were the most common organisms in the subsample. Large boulders in the downstream portion of the site may have contributed to the “poor” biological condition. Fast-flowing water over boulders prevents organisms from inhabiting such areas.

The physical habitat at this site was rated “partially-supporting” (69.5%). A paved walking path on the right bank, and an upstream playground, could have some impact on the habitat condition surrounding the stream.

Site 126 - Located off Towering Oak Path, this 4th-order stream was rated “fair” (3.22) for biological condition. There were 94 total organisms found, the lowest total of the subwatershed, representing 31 total taxa. The most common organisms found were moderately pollution tolerant – *Cheumatopsyche* (t.v. = 5) and *Hydropsyche* (Trichoptera: Hydropsychidae, t.v. = 6), both net-spinning caddisflies. Twelve cobble samples were taken from a single 20m long riffle area, the only riffle available to sample. The remaining eight jabs were divided between snag and vegetated bank habitat.

Physical habitat condition was rated in the “non-supporting” category (59.5%). This score is close to the “partially-supporting” cutoff (60.1). Marginal scores were given in the bank stability, embeddedness, epifaunal substrate/available cover, and vegetative protection categories.

Site 127 - This 2nd-order stream is located off Guilford Road, and was rated in “fair” biological condition (3.44). The subsample contained 101 individuals. Mayflies of the pollution intolerant family Ephemerellidae (Ephemeroptera, t.v. = 2) were the most common taxa. Dipertans (true flies) were also abundant in the sample.

The physical habitat at site was rated “non-supporting” of aquatic life (53%). Pebble count data revealed over half of the site (51%) was dominated by sand, reducing available habitat for

benthic macroinvertebrates. The right bank received a poor riparian zone width score, due to the site being bordered by a mowed lawn.

Site 128 - This site is on a 1st-order stream, located at the 13050 block of Rt. 108 (Clarksville Pike). It received a “fair” (3.22) biological rating. Of the 108 total individuals subsampled, 17.6% were organisms in the tribe Tanytarsini, a relatively sensitive Chironomid (midge). Dipterans were represented by 25 different taxa.

Physical habitat was rated “partially-supporting” (66%). This small stream runs near mowed lawns, which could be impacting the riparian vegetative zone width and the vegetative protection (both of which received the lowest scores at this site).

Site 129 - The mainstem of the Middle Patuxent River is considered a 4th-order stream at this site. The biological condition was rated “fair” (3.22). Of the 108 individuals subsampled, only 14% were considered to be pollution tolerant. The most common organisms found were the moderately tolerant *Cheumatopsyche* (t.v. = 5).

This site was rated “partially-supporting” (60.5%) for physical habitat condition. Sediment deposition and channel flow status scored in the marginal range. Pebble count data revealed that 43% of the site contained sand of various sizes (very fine - very coarse) which increase the amount of deposition in the channel, therefore reducing flow.

Site 130 - This site is located on a 1st-order stream just upstream of I-95, near the exit ramp of the Maryland Welcome Center. It received a “fair” (3.00) biological condition rating. Twenty-five percent of the 106 total organisms subsampled were pollution tolerant, such as *Prosimulium* (Diptera: Simuliidae, t.v. = 7). However, 18 of the 30 total taxa represented were relatively pollution sensitive (t.v. = 0-3). The downstream portion of this site is located at the mouth of the culvert under I-95. Two concrete drains allow runoff from the highway to directly enter the stream. This location probably contributes to the “non-supporting” (51.6%) physical habitat rating for this site.

Middle Middle Patuxent

Data Overview

Three 3rd-order, two 2nd-order, and five 1st-order streams were sampled in this subwatershed (Figure 6, Table 10). The mean biological rating for this subwatershed is “fair” ($\bar{x} = 3.59 \pm 0.29$, $n = 10$). Nine of the ten sites sampled received “fair” ratings and one site received a “good” rating.

The mean physical habitat rating for this subwatershed is “non-supporting” (53% of maximum). Two sites were rated “partially-supporting” and the other eight sites received “non-supporting” ratings. There was a negative correlation between habitat and the B-IBI for this subwatershed ($r=0.39$). This is an indication that potential nutrient enrichment is causing an elevation in overall biological condition. This portion of the subwatershed has a higher level of agriculture and pasture lands than the Upper or Lower Middle Patuxent.

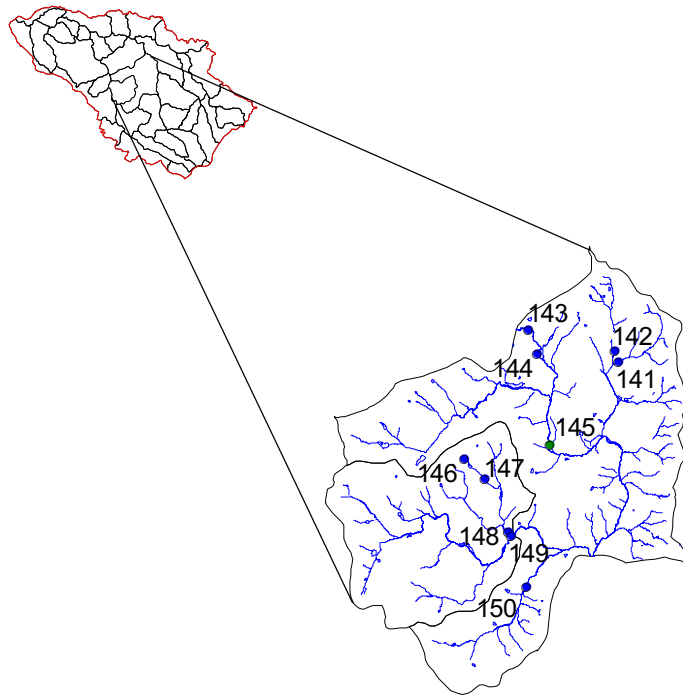


Figure 6. Color-coded biological condition ratings for the Middle Middle Patuxent River subwatershed. Green = good, blue = fair, yellow = poor, red = very poor. 141-150 indicate site numbers.

Table 10. Summary of biological and habitat scores in the Middle Middle Patuxent subwatershed.

Site	Benthic IBI Score	Biological Rating	Habitat Score	Habitat Rating	Stream Order
141	3.67	Fair	113	Non Supporting	1
142	3.89	Fair	107	Non Supporting	1
143	3.66	Fair	109	Non Supporting	3
144	3	Fair	125	Partially Supporting	3
145	4.11	Good	82	Non Supporting	3
146	3.67	Fair	105	Non Supporting	1
147	3.22	Fair	92	Non Supporting	1
148	3.44	Fair	110	Non Supporting	2
149	3.44	Fair	120	Partially Supporting	2
150	3.22	Fair	93	Non Supporting	1

Site Specific Results

Site 141 - This site is on a 1st-order stream on the Holly House Farm property, off Folly Quarter Road. It is the first stream crossing at the farm headed away from the main road. Biological condition was rated “fair” (3.67). Of the 26 total taxa subsampled, almost 52% were pollution sensitive Ephemeropterans (mayflies), the highest percentage in this subwatershed. Forty-nine of the 104 individuals were Ephemerellidae (t.v. = 2). The location of this site in a horse pasture, just downstream of the farm drive culvert, probably influenced the “non-supporting” (56.5%) physical habitat rating. The riparian zone was narrow (especially along the left bank) due to surrounding farm fields. Pebble count data estimated 51% of the streambed was covered in sand.

Site 142 - This site is also located on the Holly House Farm property, off Folly Quarter Road. It received a “fair” (3.89) rating for biological condition. There were 123 total individuals in the subsample, representing 45 total taxa. Eleven percent of the subsample consisted of Tanytarsini, a relatively sensitive midge. The most common taxa was Ephemerellidae (t.v. = 2) composing 15% of the subsample.

Physical habitat was rated “non-supporting” (53.5%). Other than a narrow riparian zone, this stream is surrounded by horse pasture. A large amount of sediment was observed in the stream. High sediment volumes fill in the optimal spaces where benthic macroinvertebrates live. Sediment also increases the turbidity in a stream, allowing less sunlight to enter the system.

Site 143 - Located on a 3rd-order stream in the 12200 block of Triadelphia Road, this site was rated in “fair” (3.66) biological condition. Of the 103 total individuals subsampled, 20% were in the pollution sensitive order Ephemeroptera (mayflies). Less than 1% of the sample contained organisms considered to be pollution tolerant (t.v. - 7-10).

This site received a “non-supporting” (54.5%) physical habitat rating. Both vegetative protection and bank stability scored in the marginal to poor range. Pebble count data indicated that sand and gravel are found in equal amounts in the stream (33%). There was also an abundance of silt/clay sampled (24%).

Site 144 - This 3rd-order stream is located off Etchison Drive. The biological condition was rated “fair” (3.44). Only 23 total taxa were found, the lowest total in the subwatershed. However, this site is the only one in the entire Middle Patuxent River Watershed that did not have any organisms that were tolerant of pollution. The dominant taxon was Ephemereleididae (t.v. = 2).

High riparian zone scores ensured this site a “partially-supporting” (62.5%) physical habitat rating. However, the bank stability and vegetative protection categories scored in the marginal range. Twenty-nine percent of the streambottom was sand (very fine - very coarse).

Site 145 - The University of Maryland Central Farm surrounds this site on the mainstem of the Middle Patuxent River. Biological condition was rated “good” (4.11). This site had 13 EPT taxa, the highest total in the subwatershed.

However, the location of this site on experimental farm property appeared to have substantially influenced the physical habitat score. In fact, this site received the lowest total habitat score in the subwatershed, placing it in the “non-supporting” (41%) category. Mowed or grazed land surrounded the site, with only a couple trees present. Extreme bank sloughing and many raw areas influenced the bank stability and vegetative protection scores. The location of this site on experimental farmland, suggests that a mixture of stream stressors (manure: nutrients, crops: pesticides) could be raising the biological scores above the natural potential in a physically degraded stream. This is evidenced in the combination of a high rating for biological condition and a low physical habitat score.

Site 146 - This 1st-order stream is located off Heritage Hill Lane. The biological condition was rated “fair” (3.67). The subsampled contained 104 total individuals, representing 29 total taxa. The most common taxa were *Diplectrona* (Trichoptera: Hydropsychidae, t.v. = 2), *Rhyacophila* (Trichoptera: Rhyacophilidae, t.v. = 21), and *Larsia* (Diptera: Chironomidae, t.v. = 6).

Physical habitat condition at this site received a “non-supporting” (52.5%) rating. Pebble count data at this site indicated that 79% of the channel is composed of sand, the highest percentage in the subwatershed. Private property, with a mowed lawn, bordered the left bank, decreasing the riparian zone width enough to rank it in the poor category.

Site 147 - This 1st-order stream, located off Heritage Hill Lane was rated in “fair” (3.22) biological condition. Pollution tolerant taxa such as *Stegopterna* (t.v. = 7) and *Corynoneura*

(Diptera: Chironomidae, t.v. = 7) comprised 45% of the sample, the highest percentage of tolerant individuals found in this subwatershed. The physical habitat received a “non-supporting” (46%) rating. Most of the parameters scored in the marginal range. The narrow riparian zone on the right bank (bordered by a cornfield) was placed in the poor category.

Site 148 - Biological condition was rated “fair” (3.44) at this 2nd-order stream located on the Brick House Farm property, around the 4800 block of Sheppard Lane. Seventeen percent of the 105 individuals subsampled were Ephemeropterans (mayflies). Fifteen of the 28 total taxa were in the Dipteran order. The most common sensitive organisms were *Ephemerella* (Ephemeroptera: Ephemerellidae, t.v. = 2), *Oulimnius* (Coleoptera: Elmidae, t.v. = 2), and *Amphinemura* (Plecoptera: Nemouridae, t.v. = 3).

In addition to containing a horse pasture, Brick House Farm runs a factory that bottles water from nearby underground springs. It is likely, however, that the groundwater aquifer feeds the stream, thus the operation *could* affect total flow. This site was rated “non-supporting” (55%) of aquatic life. Impacts on the physical habitat surrounding the stream tend to be typical of streams that run through farmland – marginal bank stability and vegetative protection. Also, the high biological condition score combined with a low physical habitat score tends to suggest the possibility of nutrient enrichment in the stream, likely increased by runoff from the adjacent pasture.

Site 149 - This site is also located on the Brick House Farm property, off Sheppard Lane. This site received a “fair” (3.44) biological condition rating. Forty-three total taxa were found in the subsample, one of the highest totals in this subwatershed. Midges such as *Orthocladius* (Diptera: Chironomidae, t.v. = 6), composed 63% of the sample, the highest percentage in the whole subwatershed. This site is on the same 2nd-order stream that runs through the Brick House Farm property. It received a “non-supporting” (60%) physical habitat rating. Half of the bottom substrates were fines (sands and silt/clay).

Site 150 - This site is located on a 1st-order stream, downstream of the culvert under Sheppard Lane. It received a “fair” rating (3.22) for biological condition. Of the 113 total individuals subsampled, 15% were in the tanytarsine midges, relatively sensitive organisms.

An upstream culvert and nearby maintained lawns may have contributed to the “non-supporting” (46.5%) physical habitat rating. Banks were eroded and vegetation was sparse, resulting in bank stability and vegetative protection parameters being scored in the poor category.

Upper Middle Patuxent

Data Overview

Of the 10 sites in this subwatershed, only eight sites were sampled for benthic macroinvertebrates due to dry channels (Figure 7, Table 11). Habitat assessments were conducted at all sites. Sites located on channels that are dry during the sampling season are not replaced with alternates due to the probability-based design of the project. In this case, it allows for extrapolation that 20% of the first-order streams in the Upper Patuxent subwatershed were dry during the Spring of 2002. Both of the dry streams were most likely affected by the statewide drought and unusually dry winter. As a result, five 1st-order, one 2nd-order, and two 3rd-order streams were sampled for benthic macroinvertebrates. The mean biological condition in this subwatershed was “fair” ($\bar{x} = 3.39 \pm 0.57$, $n = 8$). Two streams were rated “poor”, five were “fair”, and one was in “good” biological condition.

The mean physical condition in this subwatershed was “non-supporting” (51% of maximum). Of the ten sites sampled for physical condition, eight were “non-supporting” and two were “partially-supporting” of aquatic life.

Site Specific Results

Site 161 - This 1st-order stream is off McKendree Road. The biological condition received a “poor” (2.56) rating. This site had the highest occurrence of pollution tolerant organisms in the subwatershed (47%), such as *Simulium* (t.v. = 7).

This stream was immediately adjacent to pastureland. The physical habitat rating was “non-supporting” (38%). Pebble count data revealed that 49% of the channel was composed of silt/clay. An abundance of this type of sediment takes up spaces that benthic macroinvertebrates prefer to inhabit. It also creates higher levels of turbidity, which block the sun’s rays from shining into the stream to promote algal growth. Habitat categories that received poor ratings included bank stability, riparian zone width, and vegetative protection.

Site 162 - On the date biology and physical habitat were sampled (March 6, 2002), the channel was dry. As stated in the data overview for this subwatershed, this condition was most likely caused by the recent regional drought. Since the stream was dry during the index period, the stream could not be sampled with a D-net for benthic macroinvertebrates.

The drought had a substantial effect on the “non-supporting” (37%) physical habitat rating. Channel flow status and velocity/depth regime received zeros. Because this is a small headwater stream it likely responds quickly to drought conditions.

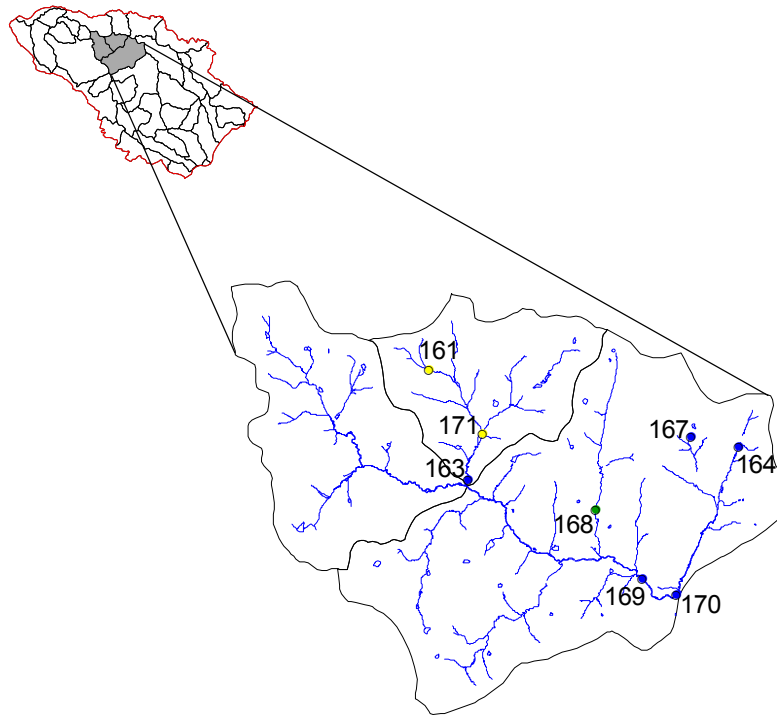


Figure 7. Color-coded biological condition ratings for the Upper Middle Patuxent River subwatershed. Green = good, blue = fair, yellow = poor, red = very poor. 161-170 indicate site numbers.

Table 11. Summary of biological and habitat scores in the Upper Middle Patuxent subwatershed.

Site	Benthic IBI Score	Biological Rating	Habitat Score	Habitat Rating	Stream Order
161	2.56	Poor	76	Non Supporting	1
162	NA	Dry	74	Non Supporting	1
163	3.67	Fair	134	Partially Supporting	2
164	3.22	Fair	119	Non Supporting	1
166	NA	Dry	73	Non Supporting	1
167	3.22	Fair	103	Non Supporting	1
168	4.33	Good	113	Non Supporting	1
169	3.67	Fair	129	Partially Supporting	3
170	3.67	Fair	115	Non Supporting	3
171	2.78	Poor	84	Non Supporting	1

*NA = Biology was not sampled at these sites due to dry conditions.

Site 163 - This 2nd-order stream off Pfeffercorn Road was rated in “fair” (3.67) biological condition. Of the 99 organisms subsampled, only 5% were pollution tolerant. In addition, 7% of the subsample contained organisms in the sensitive Tanytarsini tribe.

This site received one of the two “partially-supporting” physical habitat ratings. It received 67% of the 200 points possible on the habitat assessment form. The stream had a wide riparian zone, which was surrounded by what seemed to be fields that were no longer cultivated. It is unknown if any of this land will be developed further.

Site 164 - Forty-one total taxa, from the 114 organisms subsampled contributed substantially in this 1st-order stream’s biological condition rating of “fair” (3.22). There were also 25 different Dipteran taxa in the subsample, the highest diversity in this subwatershed. A mixture of Dipterans is generally associated with good water quality.

Physical habitat at this site was rated “non-supporting” (59.5). As this site is located downstream of I-70, there is a high potential for non-point source (NPS) pollution or runoff. Bank stability, vegetative protection, channel flow status, and embeddedness all scored in the high end of the marginal category.

Site 166 - This 1st-order stream channel is located on Crestlawn Memorial Gardens property, just north of I-70. On the day biological sampling was to occur (March 13, 2002), the stream was dry. Changes in landuse from farmland to mowed, chemically-treated cemetery property, could have made this stream particularly susceptible to the recent regional drought. However, a physical habitat assessment was performed at this site. The drought and poor surrounding landuse appeared to influence this stream, and a rating of “non-supporting” (36.5%) was assigned.

Site 167 - The biological condition of this 1st-order stream was rated “fair” (3.22). The subsampled contained 115 organisms, representing 37 total taxa.

Located just south of I-70, this stream was rated “non-supporting” (51.5%) for aquatic life use. Pebble count data revealed that the majority of the channel bed was composed of silt/clay (34%) and sands (33%). These fine sediments increased the embeddedness of riffles and covered over or filled in other epifaunal substrates. Runoff from the highway as well as upstream erosion are potential sources of these fines.

Site 168 - This site is on Terrapin Branch, a 1st-order stream on the Nixon Farm property, just north of Rt. 32. It is the only site in this subwatershed to receive a “good” (4.33) biological rating. While the site did not have any particular biological metric categories that scored substantially higher than any of the other sites, it had the most metrics that received a “good” score (5). The most abundant organisms were Ephemerellidae and *Oulimnius* (both with t.v. =

2). The downstream end of this site was about 1m upstream of a bridge/culvert for Nixon's Farm lane. This site was rated "non-supporting" for physical habitat condition (56.5%). A vineyard and apparent pastureland were both nearby. Some of this land was in close proximity to the stream, resulting in the left bank riparian zone being rated in the poor category.

Site 169 - This site is located on a 3rd-order portion on the mainstem of the Middle Patuxent, off of Elbicore Court. Biological condition was rated "fair" (3.67). Of the 111 organisms in the subsample, 40% were pollution sensitive Ephemeropterans (mayflies). This was the highest percentage in the subwatershed.

Physical habitat at this site received a "partially-supporting" (64.5%) rating. Categories given marginal scores included bank stability and vegetative protection.

Site 170 - This 3rd-order portion of the Middle Patuxent is approximately 100m downstream from the crossing of Triadelphia Mill Road. Biological condition was rated "fair" (3.67). Of the 116 organisms, less than 1% were considered to be pollution tolerant (t.v. = 7-10). The most common taxa were Ephemerellidae (t.v. = 2), *Hydropsyche* (t.v. = 6) and *Cheumatopsyche* (t.v. = 5). This site was rated in "non-supporting" (57.5%) physical habitat condition. The right bank was bordered by a partially cleared forest, allowing for little vegetative protection and poor bank stability.

Site 171 - This 1st-order stream located on the Dawn Acres Angus Farm on Rte. 144, was the only alternate site chosen in the Middle Patuxent Watershed. It replaced Site 165, which was located on the Crestlawn Memorial Gardens property, but had been filled in by the property owner to the point that there was no longer any channel. The biological condition received a "poor" (2.78) rating. The subsample contained 99 individuals, representing 27 total taxa. There were no sensitive Ephemeropterans (mayflies) found in the sample. The most common organism was *Parametrioctenus* (Diptera: Chironomidae, t.v. = 5, 35%).

Physical habitat condition was rated "non-supporting" (42%) at this site. This stream was shallow, narrow, and had marginal bank stability and vegetative protection. The embeddedness, sediment deposition, and channel flow status categories were all ranked in "poor" condition. Pebble count data revealed that the entire channel was composed of fines (73% silt/clay, 27% sands).

WATERSHED COMPARISONS

The monitoring and assessment program thus far has sampled three major watershed groups: the Little Patuxent River, Middle Patuxent River, and Cattail Creek/Brighton Dam. For these three, the Middle Patuxent River has the highest mean B-IBI score (3.65 ± 0.18), as compared to 3.40 ± 0.49 and 2.26 ± 0.39 for the Cattail Creek/Brighton Dam and Little Patuxent River watersheds,

respectively. These correspond somewhat to expectations, based on the intensity of land use conversions. For example, the biological condition of the Middle Patuxent River watershed tended to decrease with an increase of agriculture and other managed land uses (Figure 8). Generally, the biological condition varies with the predominant land use type: forested vs. developed vs. agriculture.

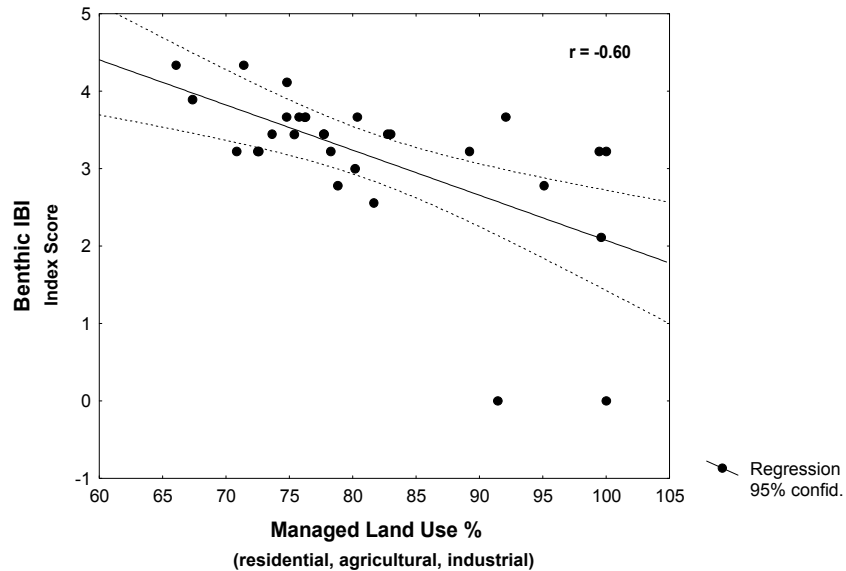


Figure 8. Relationship between managed land use percent and resulting biological conditions.

The majority of the sites within the Cattail Creek/Brighton Dam subwatershed, received “fair” or “good” biological ratings, paired with “partially” or “non-supporting” physical habitat ratings (Figure 9). This is believed to be due to nutrient enrichment that can occur as a result of increasing agricultural or urban land uses (Wang et al. 2001). The unnatural addition of nutrients to the stream artificially raises the biological quality beyond the potential that the existing habitat would naturally support.

The biological conditions in the Little Patuxent River subwatersheds show a more conventional response to habitat alteration (Paul & Meyer 2001). The biological conditions were mostly rated as “poor” and “very poor” with “partially or non-supporting” physical habitat assessments (Figure 10). This is the tendency that would be expected with habitat depletion. Poor riparian zone and in-stream habitat allow for only those organisms that are most tolerant of severe stressors to remain in that system.

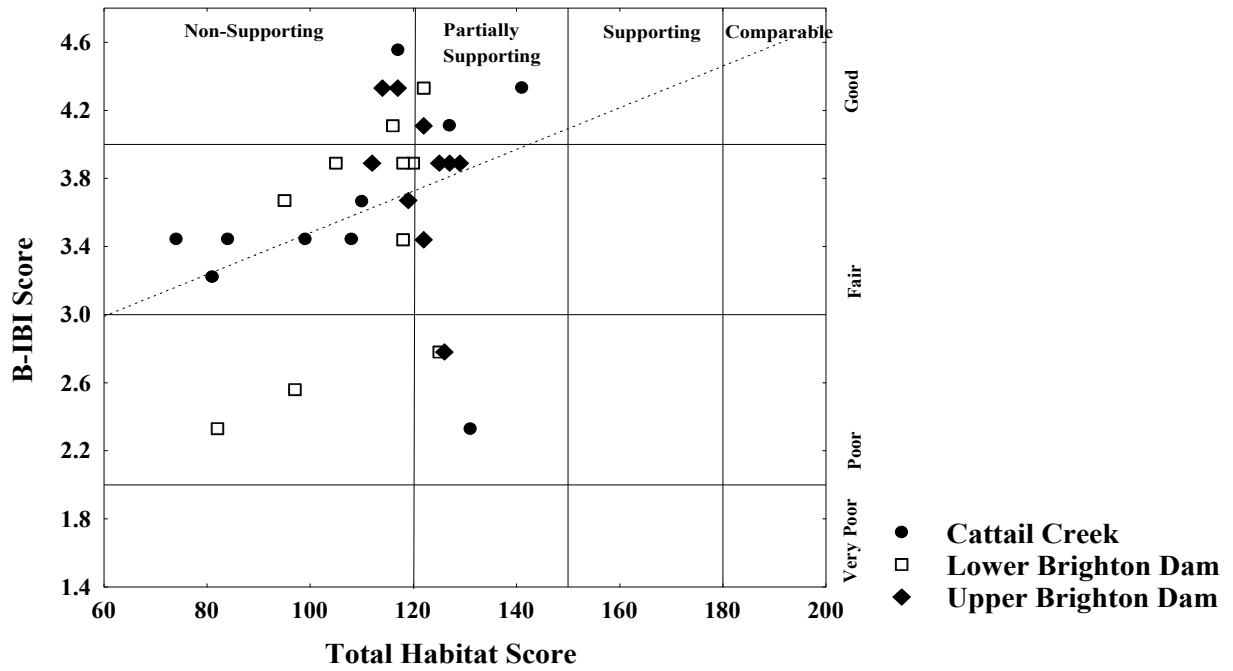


Figure 9. Benthic IBI scores and physical habitat ratings for each site in the Cattail Creek and Brighton Dam subwatersheds.

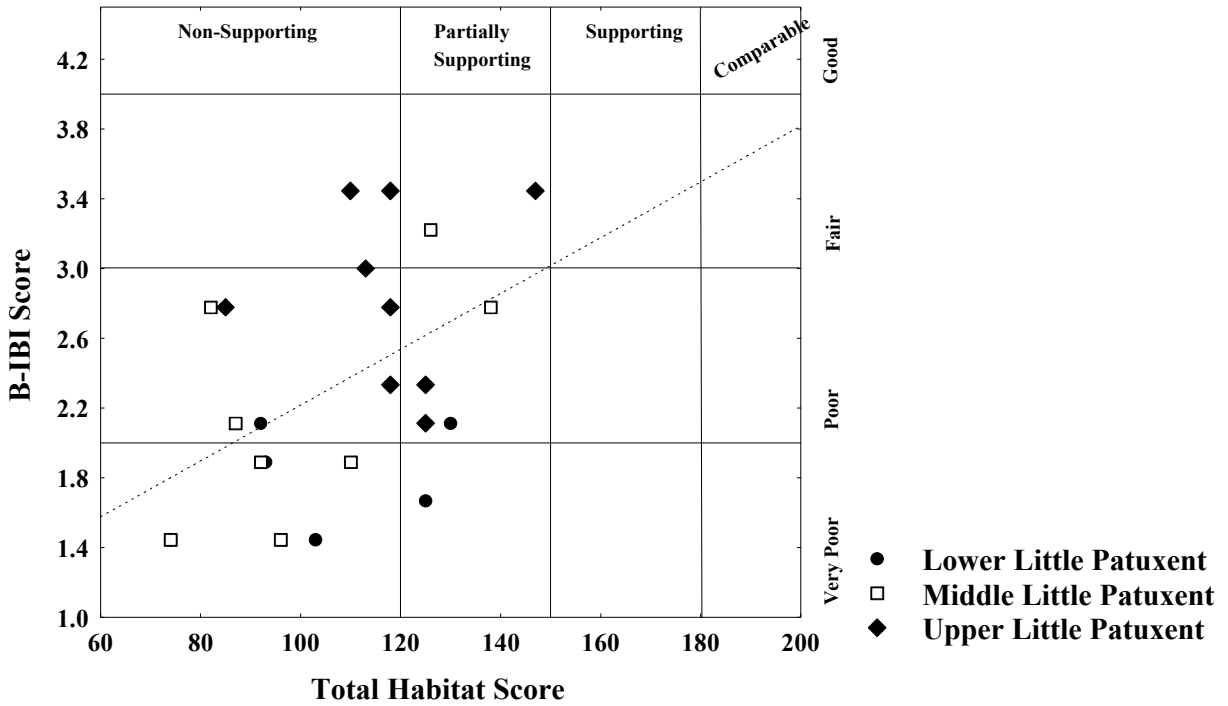


Figure 10. Benthic IBI scores and physical habitat ratings for each site in the Little Patuxent watershed.

III. CONCLUSIONS AND RECOMMENDATIONS

The results of these biological assessments lead to six general recommendations:

- develop watershed protection and rehabilitation actions
- conduct further diagnostic analyses
- ensure baseline condition for comparison with long-term monitoring activities
- implement public outreach strategies
- maintain comparability with State methods
- maintain quality assurance/quality control standards.

In this section, summary recommendations are provided to facilitate use of the results both in natural resource management decision-making and in communicating the ecological status of watersheds to the public.

Further Monitoring and Diagnostic Analysis

- Perform detailed geomorphic stability assessments for streams with suspected but unidentified hydrologic alteration.
- Perform additional analyses of Spring 2002 Index Period data: a) investigate individual metrics for correspondence with known stressor/stressor sources, b) evaluate coverage of stream sampling . Namely, report on frequency of intermittent or dry streams, streams destroyed (filled in) or enclosed by pipes due to development, streams heavily influenced by beaver activity, and those streams inaccessible due to landowner issues. This information will provide more general knowledge about the health of County streams, and offer additional possible explanations for current stream condition.
- Ensure continuation of a multi-year, rotating basin program.
- Select several individual, probability-based, sites for annual monitoring for long term trend analysis. Selected probability sites in each watershed become targeted. Select sites monitored in years one and two that could benefit from future restoration. Also, select sites to be revisited to see if high biological condition is being maintained naturally.
- Collect and maintain historic cross-sectional measurement data to identify major changes in stream channel size and shape.
- Supplement MBSS sampling throughout the county with additional biomonitoring sites.
- Select biological monitoring sites to perform targeted sampling to assess long-term County projects, such as effectiveness of BMPs, or identify sites where BMPs (e.g., retention ponds,

riparian revegetation, bank stabilization, grade control structures, or limiting access of cattle to streams) could be installed to improve physical habitat and biological conditions.

- Produce an overall 3-year Countywide report of stream condition by compiling the results of the complete 3-year rotation cycle.

Protection and Rehabilitation

- Use aggregated biological index scores to prioritize watersheds for protection or rehabilitation activities. The protection and rehabilitation of natural resources must be integrated to maintain a healthy environment. It is as important to exclude stressors from moderate to high quality streams (protection), as it is to remove stressors and restructure areas with depleted physical habitat and biological condition (rehabilitation/ restoration) from fair to very poor quality streams. Where streams exhibit “good” biological condition, effective protection and preservation will require preventing the introduction of new stressors.
- Perform diagnostic sampling and analysis on streams with “fair”, “poor”, or “very poor” biological condition to determine the predominant stressors. If the stream is physically unstable, determination and correction of upstream hydrologic or geomorphic alteration is recommended. If nutrient enrichment or toxic contamination is suspected, sediment and water column chemical analyses and toxicity testing should be conducted to determine, correct, and eliminate sources.
- Create incentives for BMP installation and maintenance. Develop stakeholder groups to help farmers and developers work together to have the least impact possible on their surrounding environment.

Public Outreach

- Provide the public and water quality professionals access to biomonitoring information through a variety of mechanisms including: internet PDF files, advertisement to citizens, presentation at community meetings, and press releases announcing availability of the report. Expedite printing and public release of the report.
- Create reader-friendly public brochures that present data and findings to the general public. Update these brochures as biomonitoring continues to keep the public current on the health of their local watersheds.

Comparability with State methods

- Expand communication and collaboration with other state organizations (WRD, University of Maryland) that could potentially assist with future sampling.
- Continue inter-agency (multiple Howard County offices and MBSS) review of yearly biomonitoring reports.

Quality Assurance/Quality Control (QA/QC)

- Maintain QA/QC training and documentation for program.
- Continue attendance at MBSS training in order to ensure comparability with State program.
- Perform blind re-identification of 10% total benthic samples using an independent taxonomist.

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V. APPENDICES

APPENDIX A: Benthic Macroinvertebrate Taxa List

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
121	0	Insecta	Coleoptera	Elmidae		Macronychus	Macronychus	1
121	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	2
121	0	Insecta	Coleoptera	Gyrinidae		Dineutus	Dineutus	2
121	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	11
121	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	1
121	0	Insecta	Diptera	Chironomidae		Nanocladius	Nanocladius	1
121	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	4
121	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	5
121	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	1
121	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	1
121	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
121	0	Insecta	Diptera	Chironomidae		Rheocricotopus	Rheocricotopus	3
121	0	Insecta	Diptera	Chironomidae		Saetheria	Saetheria	1
121	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	5
121	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	10
121	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
121	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	3
121	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	2
121	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
121	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
121	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
121	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	5
121	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	6
121	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	2
121	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	5
121	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	6
121	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	4
121	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	8
121	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	2
121	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	3
121	0	Insecta	Plecoptera	Perlidae		Perlidae	Perlidae	3
121	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	7
121	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	2
121	0	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	1
121	0	Insecta	Trichoptera	Psychomyiidae		Lype	Lype diversa	1
121	0	Malacostraca	Amphipoda	Crangonyctidae		Crangonyx	Crangonyx	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
122	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
122	0	Insecta	Coleoptera	Dytiscidae		Agabus	Agabus	3
122	0	Insecta	Coleoptera	Dytiscidae		Dytiscidae	Dytiscidae	4
122	0	Insecta	Coleoptera	Dytiscidae		Hygrotus	Hygrotus	2
122	0	Insecta	Coleoptera	Dytiscidae		Lioporeus	Lioporeus	2
122	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	33
122	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	5
122	0	Insecta	Diptera	Chironomidae		Diplocladius	Diplocladius	7
122	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1
122	0	Insecta	Diptera	Chironomidae		Limnophyes	Limnophyes	1
122	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	4
122	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	21
122	0	Insecta	Diptera	Chironomidae		Parametriocnemus	Parametriocnemus	1
122	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	3
122	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
122	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	1
122	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	3
122	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	3
122	0	Insecta	Diptera	Chironomidae	Tanytarsini	Stempellinella	Stempellinella	1
122	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
122	0	Insecta	Diptera	Stratiomyidae		Caloparyphus	Caloparyphus	1
122	0	Insecta	Odonata	Coenagrionidae		Coenagrionidae	Coenagrionidae	1
123	0	Gastropoda	Basommatophora	Planorbidae		Gyraulus	Gyraulus	1
123	0	Insecta	Coleoptera	Dytiscidae		Helichus	Helichus	1
123	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	1
123	0	Insecta	Coleoptera	Elmidae		Macronychus	Macronychus	1
123	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	3
123	0	Insecta	Diptera	Chironomidae		Ablabesmyia	Ablabesmyia	2
123	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	1
123	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
123	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1
123	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	5
123	0	Insecta	Diptera	Chironomidae		Nanocladius	Nanocladius	2
123	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	7
123	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius lignicola	1
123	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	3

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
123	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	14
123	0	Insecta	Diptera	Chironomidae		Paramerina	Paramerina	1
123	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	1
123	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	2
123	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
123	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	2
123	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	2
123	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	2
123	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	2
123	0	Insecta	Diptera	Chironomidae	Tanytarsini	Stempellinella	Stempellinella	1
123	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
123	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	2
123	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
123	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
123	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
123	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	5
123	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	1
123	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
123	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	4
123	0	Insecta	Odonata	Calopterygidae		Calopteryx	Calopteryx	1
123	0	Insecta	Odonata	Coenagrionidae		Argia	Argia	1
123	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	1
123	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	18
123	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	4
123	0	Insecta	Trichoptera	Leptoceridae		Mystacides	Mystacides	2
123	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
123	0	Malacostraca	Isopoda	Asellidae		Caecidotea	Caecidotea	1
123	0	Oligochaeta	Tubificida	Naididae		Nais	Nais pardalis	1
124	0	Gastropoda	Basommatophora	Lymnaeidae		Fossaria	Fossaria	1
124	0	Insecta	Coleoptera	Elmidae		Macronychus	Macronychus	1
124	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	3
124	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	1
124	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	5
124	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	1
124	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	14
124	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	3

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
124	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	4
124	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	3
124	0	Insecta	Diptera	Chironomidae		Rheocricotopus	Rheocricotopus	2
124	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	2
124	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	2
124	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	3
124	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	2
124	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	2
124	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
124	0	Insecta	Diptera	Empididae		Clinocera	Clinocera	4
124	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	3
124	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
124	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
124	0	Insecta	Ephemeroptera	Ameletidae		Ameletus	Ameletus	1
124	0	Insecta	Ephemeroptera	Baetidae		Baetidae	Baetidae	2
124	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	9
124	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	1
124	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	3
124	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	3
124	0	Insecta	Ephemeroptera	Isonychiidae		Isonychia	Isonychia	4
124	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	4
124	0	Insecta	Plecoptera	Perlidae		Perlidae	Perlidae	2
124	0	Insecta	Plecoptera	Taeniopterygidae		Taenionema	Taenionema	1
124	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	4
124	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	4
124	0	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	1
124	0	Insecta	Trichoptera	Polycentropodidae		Polycentropus	Polycentropus	1
124	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	2
125	0	Gastropoda	Basommatophora	Ancylidae		Ferrissia	Ferrissia	1
125	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	2
125	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	6
125	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	1
125	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	2
125	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
125	0	Insecta	Diptera	Chironomidae		Dicrotendipes	Dicrotendipes	1
125	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
125	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	4
125	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	2
125	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	1
125	0	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	2
125	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	7
125	0	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	1
125	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	2
125	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	3
125	0	Insecta	Diptera	Empididae		Clinocera	Clinocera	3
125	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
125	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	8
125	0	Insecta	Diptera	Simuliidae		Simuliidae	Simuliidae	2
125	0	Insecta	Diptera	Simuliidae		Stegopterna	Stegopterna	15
125	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	2
125	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	2
125	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	3
125	0	Insecta	Trichoptera	Glossosomatidae		Glossosoma	Glossosoma	1
125	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	6
125	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	3
125	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	34
125	1	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
125	1	Insecta	Coleoptera	Dytiscidae		Dytiscidae	Dytiscidae	1
125	1	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	2
125	1	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	7
125	1	Insecta	Coleoptera	Elmidae		Stenelmis	Stenelmis	1
125	1	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	3
125	1	Insecta	Diptera	Chironomidae		Diplocladius	Diplocladius	5
125	1	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	7
125	1	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	1
125	1	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	2
125	1	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	4
125	1	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	6
125	1	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	11
125	1	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
125	1	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	1
125	1	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
125	1	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	5
125	1	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	1
125	1	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
125	1	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	5
125	1	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
125	1	Insecta	Diptera	Empididae		Chelifera	Chelifera	1
125	1	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	3
125	1	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	4
125	1	Insecta	Diptera	Simuliidae		Simuliidae	Simuliidae	1
125	1	Insecta	Diptera	Simuliidae		Stegopterna	Stegopterna	5
125	1	Insecta	Diptera	Tipulidae		Antocha	Antocha	2
125	1	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
125	1	Insecta	Ephemeroptera	Ameletidae		Ameletus	Ameletus	3
125	1	Insecta	Odonata	Calopterygidae		Calopteryx	Calopteryx	2
125	1	Insecta	Plecoptera	Capniidae		Capniidae	Capniidae	3
125	1	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	4
125	1	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	4
125	1	Insecta	Trichoptera	Psychomyiidae		Lype	Lype diversa	1
125	1	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	2
126	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
126	0	Insecta	Coleoptera	Dytiscidae		Helichus	Helichus	1
126	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	2
126	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	6
126	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	6
126	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	2
126	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	1
126	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	3
126	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	5
126	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	1
126	0	Insecta	Diptera	Chironomidae		Psectrocladius	Psectrocladius	5
126	0	Insecta	Diptera	Chironomidae		Rheocricotopus	Rheocricotopus	1
126	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
126	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	2
126	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	1
126	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
126	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
126	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
126	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	8
126	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	2
126	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	2
126	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	2
126	0	Insecta	Megaloptera	Corydalidae		Corydalis	Corydalis	1
126	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	3
126	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	3
126	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	2
126	0	Insecta	Plecoptera	Pteronarcyidae		Pteronarcyidae	Pteronarcyidae	1
126	0	Insecta	Plecoptera	Taeniopterygidae		Taenionema	Taenionema	1
126	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	10
126	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	17
126	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus hoffmeisteri	1
127	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	6
127	0	Insecta	Coleoptera	Elmidae		Elmidae	Elmidae	2
127	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	5
127	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	6
127	0	Insecta	Coleoptera	Hydrophilidae		Tropisternus	Tropisternus	1
127	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	1
127	0	Insecta	Diptera	Chironomidae		Chironomini	Chironomini	1
127	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	2
127	0	Insecta	Diptera	Chironomidae		Dicrotendipes	Dicrotendipes	1
127	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	1
127	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus	4
127	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus/Cricotopus	3
127	0	Insecta	Diptera	Chironomidae		Paramerina	Paramerina	1
127	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	5
127	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	1
127	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	1
127	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	5
127	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	1
127	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
127	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	1
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	2
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	4

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	3
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	3
127	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
127	0	Insecta	Diptera	Empididae		Chelifera	Chelifera	1
127	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	2
127	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	2
127	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	3
127	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
127	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	12
127	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	1
127	0	Insecta	Odonata	Calopterygidae		Calopteryx	Calopteryx	2
127	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	1
127	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	8
127	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	1
127	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
127	0	Oligochaeta	Tubificida	Naididae		Nais	Nais pardalis	1
127	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus	2
128	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	3
128	0	Insecta	Coleoptera	Hydrophilidae		Hydrobius	Hydrobius	1
128	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
128	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1
128	0	Insecta	Diptera	Chironomidae		Heterotrissocladius	Heterotrissocladius	1
128	0	Insecta	Diptera	Chironomidae		Limnophyes	Limnophyes	3
128	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	2
128	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	5
128	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	4
128	0	Insecta	Diptera	Chironomidae		Paralauterborniella	Paralauterborniella	1
128	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	16
128	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	1
128	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	1
128	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
128	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	10
128	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	10
128	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	3

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	2
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	2
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	2
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Stempellinella	Stempellinella	2
128	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	8
128	0	Insecta	Diptera	Dixidae		Dixa	Dixa	1
128	0	Insecta	Diptera	Psychodidae		Psychodidae	Psychodidae	1
128	0	Insecta	Diptera	Tabanidae		Chrysops	Chrysops	1
128	0	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	4
128	0	Insecta	Ephemeroptera	Baetidae		Baetidae	Baetidae	2
128	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	1
128	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	1
128	0	Insecta	Plecoptera	Perlodidae		Isoperla	Isoperla	1
128	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	3
128	0	Insecta	Trichoptera	Limnephilidae		Limnephilidae	Limnephilidae	1
128	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
128	0	Malacostraca	Amphipoda	Hyalellidae		Hyalella	Hyalella azteca	1
128	0	Oligochaeta	Lumbriculida	Lumbriculidae		Lumbriculidae	Lumbriculidae	1
128	0	Oligochaeta	Tubificida	Enchytraeidae		Enchytraeidae	Enchytraeidae	7
128	0	Pelecypoda	Veneroidea	Pisidiidae		Pisidium	Pisidium	1
129	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
129	0	Insecta	Coleoptera	Elmidae		Macronychus	Macronychus	2
129	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	4
129	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	2
129	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	7
129	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1
129	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	1
129	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	11
129	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	2
129	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	3
129	0	Insecta	Diptera	Chironomidae		Psectrocladius	Psectrocladius	1
129	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	1
129	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
129	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
129	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	1
129	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
129	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	2
129	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
129	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
129	0	Insecta	Diptera	Empididae		Clinocera	Clinocera	2
129	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	9
129	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	5
129	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	2
129	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	2
129	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	4
129	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	1
129	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	4
129	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	1
129	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	1
129	0	Insecta	Plecoptera	Perlidae		Perlidae	Perlidae	1
129	0	Insecta	Plecoptera	Taeniopterygidae		Taeniopteryx	Taeniopteryx	1
129	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	15
129	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	11
129	0	Nemertea	Nemertea	Nemertea		Nemertea	Nemertea	1
129	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus	1
129	0	Pelecypoda	Veneroidea	Corbiculidae		Corbicula	Corbicula fluminea	1
130	0	Insecta	Coleoptera	Halplidae		Peltodytes	Peltodytes	1
130	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	4
130	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	1
130	0	Insecta	Diptera	Chironomidae		Diplocladius	Diplocladius	1
130	0	Insecta	Diptera	Chironomidae		Natarsia	Natarsia	1
130	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	13
130	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	4
130	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	1
130	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	14
130	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	1
130	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	1
130	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	2
130	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	3
130	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	1
130	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
130	0	Insecta	Diptera	Empididae		Clinocera	Clinocera	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
130	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	16
130	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	1
130	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
130	0	Insecta	Ephemeroptera	Ameletidae		Ameletus	Ameletus	4
130	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	2
130	0	Insecta	Plecoptera	Capniidae/Leuctridae			Capniidae/Leuctridae	1
130	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	6
130	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	1
130	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	14
130	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	5
130	0	Insecta	Trichoptera	Limnephilidae		Limnephilidae	Limnephilidae	1
130	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	2
130	0	Oligochaeta	Tubificida	Enchytraeidae		Enchytraeidae	Enchytraeidae	1
130	0	Oligochaeta	Tubificida	Naididae		Nais	Nais communis	1
141	0	Insecta	Coleoptera	Dytiscidae		Helichus	Helichus	1
141	0	Insecta	Coleoptera	Elmidae		Ancyronyx	Ancyronyx	1
141	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
141	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	4
141	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	2
141	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	2
141	0	Insecta	Diptera	Chironomidae		Dicrotendipes	Dicrotendipes	1
141	0	Insecta	Diptera	Chironomidae		Eukiefferiella	Eukiefferiella	1
141	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	2
141	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	2
141	0	Insecta	Diptera	Chironomidae		Parametrioctenus	Parametrioctenus	3
141	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	2
141	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	6
141	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
141	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	1
141	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	2
141	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
141	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	3
141	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	2
141	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	3
141	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	49
141	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	2

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
141	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	1
141	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	1
141	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	2
141	0	Malacostraca	Amphipoda	Gammaridae		Gammarus	Gammarus	6
142	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	4
142	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	2
142	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	3
142	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	2
142	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
142	0	Insecta	Diptera	Chironomidae		Ablabesmyia	Ablabesmyia	5
142	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	2
142	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
142	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus/Cricotopus	1
142	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	2
142	0	Insecta	Diptera	Chironomidae		Parametriocnemus	Parametriocnemus	14
142	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	3
142	0	Insecta	Diptera	Chironomidae		Stilocladus	Stilocladus	2
142	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	3
142	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
142	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	6
142	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	1
142	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	3
142	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
142	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	2
142	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	1
142	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	7
142	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	4
142	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	2
142	0	Insecta	Diptera	Empididae		Chelifera	Chelifera	2
142	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	2
142	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	2
142	0	Insecta	Diptera	Tipulidae		Dicranota	Dicranota	1
142	0	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	2
142	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	18
142	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	1
142	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
142	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	1
142	0	Insecta	Odonata	Calopterygidae		Calopteryx	Calopteryx	5
142	0	Insecta	Odonata	Cordulegastridae		Cordulegaster	Cordulegaster	1
142	0	Insecta	Odonata	Gomphidae		Gomphidae	Gomphidae	2
142	0	Insecta	Plecoptera	Capniidae		Allocapnia	Allocapnia	1
142	0	Insecta	Plecoptera	Chloroperlidae		Sweltsa	Sweltsa	1
142	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	1
142	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	1
142	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	1
142	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	1
142	0	Insecta	Trichoptera	Limnephilidae		Hydatophylax	Hydatophylax	3
142	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	1
142	0	Oligochaeta	Tubificida	Naididae		Nais	Nais pardalis	2
143	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
143	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	2
143	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	6
143	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	3
143	0	Insecta	Coleoptera	Elmidae		Stenelmis	Stenelmis	2
143	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	1
143	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	1
143	0	Insecta	Diptera	Chironomidae		Parametriocnemus	Parametriocnemus	3
143	0	Insecta	Diptera	Chironomidae		Rheocricotopus	Rheocricotopus	1
143	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	4
143	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
143	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
143	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
143	0	Insecta	Diptera	Simuliidae		Simuliidae	Simuliidae	1
143	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
143	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
143	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	18
143	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
143	0	Insecta	Ephemeroptera	Heptageniidae		Stenacron	Stenacron	1
143	0	Insecta	Ephemeroptera	Isonychiidae		Isonychia	Isonychia	1
143	0	Insecta	Megaloptera	Corydalidae		Corydalus	Corydalus	1
143	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	2
143	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
143	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	1
143	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	20
143	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	20
143	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	2
143	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	1
143	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	4
144	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	1
144	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
144	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	7
144	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus	1
144	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	5
144	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	3
144	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	2
144	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	3
144	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
144	0	Insecta	Diptera	Empididae		Clinocera	Clinocera	2
144	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
144	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	37
144	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
144	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	1
144	0	Insecta	Megaloptera	Corydalidae		Corydalus	Corydalus	1
144	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	2
144	0	Insecta	Plecoptera	Perlidae		Acroneuria	Acroneuria	1
144	0	Insecta	Plecoptera	Perlidae		Perlidae	Perlidae	1
144	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	18
144	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	11
144	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	2
144	0	Insecta	Trichoptera	Psychomyiidae		Psychomyia	Psychomyia	1
144	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
145	0	Insecta	Coleoptera	Elmidae		Macronychus	Macronychus	1
145	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	5
145	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	4
145	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	3
145	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	4
145	0	Insecta	Diptera	Chironomidae		Cryptochironomus	Cryptochironomus	1
145	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
145	0	Insecta	Diptera	Chironomidae		Limnophyes	Limnophyes	1
145	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	2
145	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	3
145	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	4
145	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	1
145	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	3
145	0	Insecta	Diptera	Chironomidae		Stilocladus	Stilocladus	1
145	0	Insecta	Diptera	Chironomidae		Synorthocladus	Synorthocladus	1
145	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	7
145	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
145	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	1
145	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	2
145	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
145	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
145	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	5
145	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	1
145	0	Insecta	Ephemeroptera	Baetidae		Centroptilum	Centroptilum	2
145	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	10
145	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	5
145	0	Insecta	Odonata	Coenagrionidae		Argia	Argia	1
145	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	2
145	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	4
145	0	Insecta	Plecoptera	Perlidae		Perlidae	Perlidae	1
145	0	Insecta	Plecoptera	Perlodidae		Clioperla	Clioperla	1
145	0	Insecta	Plecoptera	Taeniopterygidae		Taenionema	Taenionema	1
145	0	Insecta	Trichoptera	Glossosomatidae		Glossosoma	Glossosoma	1
145	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	7
145	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	2
145	0	Insecta	Trichoptera	Polycentropodidae		Polycentropus	Polycentropus	2
145	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
145	0	Pelecypoda	Veneroida	Corbiculidae		Corbicula	Corbicula fluminea	6
146	0	Clitellata	Haplotaxida	Enchytraeidae		Henlea	Henlea	1
146	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	6
146	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	1
146	0	Insecta	Diptera	Ceratopogonidae		Ceratopogon	Ceratopogon	2
146	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
146	0	Insecta	Diptera	Chironomidae		Larsia	Larsia	10
146	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	8
146	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
146	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
146	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	5
146	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	3
146	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
146	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	3
146	0	Insecta	Diptera	Dixidae		Dixa	Dixa	1
146	0	Insecta	Diptera	Tipulidae		Dicranota	Dicranota	1
146	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	2
146	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	5
146	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	1
146	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	3
146	0	Insecta	Odonata	Cordulegastridae		Cordulegaster	Cordulegaster	1
146	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	9
146	0	Insecta	Plecoptera	Perlodidae		Perlodidae	Perlodidae	1
146	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	15
146	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	1
146	0	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	2
146	0	Insecta	Trichoptera	Odontoceridae		Psilotreta	Psilotreta	3
146	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	10
146	0	Oligochaeta	Tubificida	Lumbricidae		Lumbricidae	Lumbricidae	2
146	0	Oligochaeta	Tubificida	Naididae		Nais	Nais communis	1
146	1	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
146	1	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	4
146	1	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
146	1	Insecta	Diptera	Chironomidae		Heterotrissocladius	Heterotrissocladius	5
146	1	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	10
146	1	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	2
146	1	Insecta	Diptera	Chironomidae		Pseudorthocladius	Pseudorthocladius	1
146	1	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	1
146	1	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
146	1	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
146	1	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	5
146	1	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	4

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
146	1	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	5
146	1	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	3
146	1	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	4
146	1	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
146	1	Insecta	Diptera	Tabanidae		Chrysops	Chrysops	2
146	1	Insecta	Diptera	Tipulidae		Hexatoma	Hexatoma	1
146	1	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	8
146	1	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	8
146	1	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	2
146	1	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
146	1	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	7
146	1	Insecta	Megaloptera	Sialidae		Sialis	Sialis	1
146	1	Insecta	Odonata	Cordulegastridae		Cordulegaster	Cordulegaster	1
146	1	Insecta	Plecoptera	Chloroperlidae		Sweltsa	Sweltsa	1
146	1	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	10
146	1	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	8
146	1	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	1
146	1	Insecta	Trichoptera	Limnephilidae		Limnephilidae	Limnephilidae	1
146	1	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	1
146	1	Insecta	Trichoptera	Odontoceridae		Psilotreta	Psilotreta	2
146	1	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	1
146	1	Oligochaeta	Tubificida	Lumbricidae		Lumbricidae	Lumbricidae	1
147	0	Insecta	Diptera	Ceratopogonidae		Atrichopogon	Atrichopogon	1
147	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	3
147	0	Insecta	Diptera	Ceratopogonidae		Culicoides	Culicoides	3
147	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	4
147	0	Insecta	Diptera	Chironomidae		Diplocladius	Diplocladius	2
147	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	1
147	0	Insecta	Diptera	Chironomidae		Orthocladiinae	Orthocladiinae	1
147	0	Insecta	Diptera	Chironomidae		Parametrioctenus	Parametrioctenus	6
147	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	2
147	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
147	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	4
147	0	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	1
147	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	10
147	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
147	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
147	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	7
147	0	Insecta	Diptera	Simuliidae		Stegopterna	Stegopterna	16
147	0	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	1
147	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	3
147	0	Insecta	Ephemeroptera	Baetidae		Baetis	Baetis	2
147	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebia	Leptophlebia	1
147	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	1
147	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	1
147	0	Insecta	Plecoptera	Capniidae		Capniidae	Capniidae	1
147	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	7
147	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	4
147	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	5
147	0	Pelecypoda	Veneroida	Pisidiidae		Pisidium	Pisidium	3
148	0	Insecta	Coleoptera	Dytiscidae		Oreodytes	Oreodytes	1
148	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	1
148	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	9
148	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	11
148	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus bicinctus	1
148	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
148	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	3
148	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	9
148	0	Insecta	Diptera	Chironomidae		Parametrioctenus	Parametrioctenus	3
148	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	2
148	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
148	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	1
148	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	1
148	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
148	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	1
148	0	Insecta	Diptera	Empididae		Chelifera	Chelifera	1
148	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	17
148	0	Insecta	Diptera	Muscidae		Muscidae	Muscidae	1
148	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	1
148	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	10
148	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	7
148	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
148	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	1
148	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	12
148	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	4
148	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	2
148	0	Malacostraca	Amphipoda	Gammaridae		Gammaridae	Gammaridae	1
148	0	Malacostraca	Amphipoda	Hyaellidae		Hyaella	Hyaella azteca	1
149	0	Clitellata	Haplotaxida	Naididae		Chaetogaster	Chaetogaster limnaei	1
149	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	1
149	0	Gastropoda	Mesogastropoda	Hydrobiidae		Amnicola	Amnicola	1
149	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	7
149	0	Insecta	Coleoptera	Elmidae		Elmidae	Elmidae	2
149	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
149	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	3
149	0	Insecta	Coleoptera	Sphaeriidae		Sphaeriidae	Sphaeriidae	1
149	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
149	0	Insecta	Diptera	Ceratopogonidae		Culicoides	Culicoides	2
149	0	Insecta	Diptera	Ceratopogonidae		Probezzia	Probezzia	1
149	0	Insecta	Diptera	Chironomidae		Ablabesmyia	Ablabesmyia	1
149	0	Insecta	Diptera	Chironomidae		Chironomidae	Chironomidae	1
149	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	3
149	0	Insecta	Diptera	Chironomidae		Cryptochironomus	Cryptochironomus	1
149	0	Insecta	Diptera	Chironomidae		Dicrotendipes	Dicrotendipes	1
149	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	2
149	0	Insecta	Diptera	Chironomidae		Nanocladius	Nanocladius	1
149	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	16
149	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	4
149	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	1
149	0	Insecta	Diptera	Chironomidae		Paratendipes	Paratendipes	1
149	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
149	0	Insecta	Diptera	Chironomidae		Psectrocladius	Psectrocladius	1
149	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	2
149	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	4
149	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	2
149	0	Insecta	Diptera	Chironomidae	Tanytarsini	Cladotanytarsus	Cladotanytarsus	5
149	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
149	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
149	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	2
149	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	3
149	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	4
149	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	4
149	0	Insecta	Diptera	Tabanidae		Chrysops	Chrysops	1
149	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	2
149	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	3
149	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	1
149	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	4
149	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	1
149	0	Malacostraca	Amphipoda	Hyalellidae		Hyalella	Hyalella azteca	6
149	0	Oligochaeta	Tubificida	Naididae		Nais	Nais communis	1
149	0	Pelecypoda	Veneroida	Pisidiidae		Pisidium	Pisidium	2
150	0	Clitellata	Haplotaxida	Naididae		Nais	Nais bretscheri	2
150	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	1
150	0	Insecta	Coleoptera	Elmidae		Elmidae	Elmidae	1
150	0	Insecta	Coleoptera	Gyrinidae		Dineutus	Dineutus	1
150	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	4
150	0	Insecta	Diptera	Chironomidae		Chironomidae	Chironomidae	1
150	0	Insecta	Diptera	Chironomidae		Chironominae	Chironominae	1
150	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	7
150	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
150	0	Insecta	Diptera	Chironomidae		Dicrotendipes	Dicrotendipes	1
150	0	Insecta	Diptera	Chironomidae		Heterotrissocladius	Heterotrissocladius	1
150	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	6
150	0	Insecta	Diptera	Chironomidae		Nanocladius	Nanocladius	1
150	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	9
150	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	3
150	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	4
150	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	4
150	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	4
150	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	4
150	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	3
150	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
150	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	1
150	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	1

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150	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	4
150	0	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Cladotanytarsus	Cladotanytarsus	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	7
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	3
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Stempellinella	Stempellinella	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	1
150	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	3
150	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
150	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	1
150	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
150	0	Insecta	Ephemeroptera	Baetidae		Baetidae	Baetidae	2
150	0	Insecta	Ephemeroptera	Ephemerellidae		Eurylophella	Eurylophella	2
150	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	6
150	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	10
150	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	3
150	0	Oligochaeta	Tubificida	Tubificidae		Aulodrilus	Aulodrilus limnobius	1
150	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus hoffmeisteri	1
161	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	2
161	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
161	0	Insecta	Coleoptera	Elmidae		Stenelmis	Stenelmis	4
161	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	14
161	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
161	0	Insecta	Diptera	Ceratopogonidae		Ceratopogon	Ceratopogon	1
161	0	Insecta	Diptera	Chironomidae		Apsectrotanypus	Apsectrotanypus	1
161	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	2
161	0	Insecta	Diptera	Chironomidae		Procladius	Procladius	1
161	0	Insecta	Diptera	Chironomidae		Pseudorthocladius	Pseudorthocladius	2
161	0	Insecta	Diptera	Chironomidae		Psilometricnemus	Psilometricnemus	1
161	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	1
161	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
161	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	14
161	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	2
161	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	5

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
161	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
161	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
161	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	2
161	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
161	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	2
161	0	Insecta	Diptera	Simuliidae		Simulium	Simulium	24
161	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	3
161	0	Oligochaeta	Haplotaxida	Enchytraeidae		Fridericia	Fridericia	1
161	0	Oligochaeta	Tubificida	Enchytraeidae		Enchytraeidae	Enchytraeidae	1
161	0	Oligochaeta	Tubificida	Tubificidae		Aulodrilus	Aulodrilus japonicus	1
161	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus	6
161	0	Oligochaeta	Tubificida	Tubificidae		Limnodrilus	Limnodrilus hoffmeisteri	1
161	0	Pelecypoda	Veneroida	Pisidiidae		Pisidium	Pisidium	8
163	0	Clitellata	Haplotaxida	Naididae		Nais	Nais bretscheri	1
163	0	Gastropoda	Basommatophora	Ancylidae		Ferrissia	Ferrissia	1
163	0	Insecta	Coleoptera	Elmidae		Dubiraphia	Dubiraphia	1
163	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	2
163	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	4
163	0	Insecta	Diptera	Chironomidae		Chironomini	Chironomini	1
163	0	Insecta	Diptera	Chironomidae		Hydrobaenus	Hydrobaenus	3
163	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	1
163	0	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	1
163	0	Insecta	Diptera	Chironomidae		Parametrioctenus	Parametrioctenus	8
163	0	Insecta	Diptera	Chironomidae		Phaenopsectra	Phaenopsectra	1
163	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
163	0	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	1
163	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	1
163	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	3
163	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	2
163	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
163	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	4
163	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	6
163	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	5
163	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	3
163	0	Insecta	Trichoptera	Glossosomatidae		Glossosoma	Glossosoma	1
163	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	14

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
163	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	18
163	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	14
164	0	Gastropoda	Basommatophora	Physidae		Physa	Physa	2
164	0	Insecta	Coleoptera	Dytiscidae		Lioporeus	Lioporeus	1
164	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
164	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	2
164	0	Insecta	Diptera	Ceratopogonidae		Atrichopogon	Atrichopogon	1
164	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	2
164	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	1
164	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	1
164	0	Insecta	Diptera	Chironomidae		Larsia	Larsia	1
164	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	2
164	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	21
164	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
164	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	3
164	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	5
164	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	2
164	0	Insecta	Diptera	Chironomidae		Zavrelimyia	Zavrelimyia	5
164	0	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	1
164	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	3
164	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	2
164	0	Insecta	Diptera	Dixidae		Dixa	Dixa	1
164	0	Insecta	Diptera	Dixidae		Dixella	Dixella	1
164	0	Insecta	Diptera	Empididae		Hemerodromia	Hemerodromia	1
164	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	11
164	0	Insecta	Diptera	Simuliidae		Stegopterna	Stegopterna	6
164	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
164	0	Insecta	Diptera	Tipulidae		Hexatoma	Hexatoma	1
164	0	Insecta	Diptera	Tipulidae		Pilaria	Pilaria	1
164	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	2
164	0	Insecta	Diptera	Tipulidae		Tipulidae	Tipulidae	1
164	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
164	0	Insecta	Ephemeroptera	Leptophlebiidae		Leptophlebiidae	Leptophlebiidae	1
164	0	Insecta	Odonata	Calopterygidae		Calopteryx	Calopteryx	1
164	0	Insecta	Odonata	Gomphidae		Gomphidae	Gomphidae	1
164	0	Insecta	Plecoptera	Capniidae		Capniidae	Capniidae	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
164	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	12
164	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	1
164	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	5
164	0	Insecta	Plecoptera	Plecoptera		Plecoptera	Plecoptera	1
164	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	3
164	0	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	1
164	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	2
167	0	Insecta	Coleoptera	Hydrophilidae		Hydrobius	Hydrobius	2
167	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	2
167	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	5
167	0	Insecta	Diptera	Ceratopogonidae		Dasyhelea	Dasyhelea	1
167	0	Insecta	Diptera	Chironomidae		Alotanypus	Alotanypus	1
167	0	Insecta	Diptera	Chironomidae		Brillia	Brillia	4
167	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	2
167	0	Insecta	Diptera	Chironomidae		Natarsia	Natarsia	2
167	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	1
167	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus/Cricotopus	1
167	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	9
167	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	3
167	0	Insecta	Diptera	Chironomidae		Pseudorthocladus	Pseudorthocladus	2
167	0	Insecta	Diptera	Chironomidae		Psilometricnemus	Psilometricnemus	1
167	0	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	5
167	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
167	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	18
167	0	Insecta	Diptera	Chironomidae		Tribelos	Tribelos	2
167	0	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	12
167	0	Insecta	Diptera	Chironomidae		Zavreliomyia	Zavreliomyia	5
167	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	1
167	0	Insecta	Diptera	Empididae		Chelifera	Chelifera	1
167	0	Insecta	Diptera	Tipulidae		Hexatoma	Hexatoma	4
167	0	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	4
167	0	Insecta	Diptera	Tipulidae		Tipula	Tipula	1
167	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	1
167	0	Insecta	Odonata	Cordulegastridae		Cordulegaster	Cordulegaster	1
167	0	Insecta	Odonata	Corduliidae		Corduliidae	Corduliidae	1
167	0	Insecta	Plecoptera	Capniidae/Leuctridae			Capniidae/Leuctridae	2

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
167	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	4
167	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	4
167	0	Insecta	Trichoptera	Leptoceridae		Leptoceridae	Leptoceridae	1
167	0	Insecta	Trichoptera	Limnephilidae		Pycnopsyche	Pycnopsyche	3
167	0	Insecta	Trichoptera	Psychomyiidae		Lype	Lype diversa	1
167	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	4
167	0	Oligochaeta	Tubificida	Enchytraeidae		Enchytraeidae	Enchytraeidae	1
167	0	Oligochaeta	Tubificida	Tubificidae		Aulodrilus	Aulodrilus japonicus	2
168	0	Clitellata	Haplotaxida	Naididae		Nais	Nais bretscheri	3
168	0	Insecta	Coleoptera	Elmidae		Elmidae	Elmidae	6
168	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	18
168	0	Insecta	Coleoptera	Ptilodactylidae		Anchytarsus	Anchytarsus bicolor	1
168	0	Insecta	Diptera	Chironomidae		Ablabesmyia	Ablabesmyia	1
168	0	Insecta	Diptera	Chironomidae		Cricotopus	Cricotopus	1
168	0	Insecta	Diptera	Chironomidae		Parametriocnemus	Parametriocnemus	1
168	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	1
168	0	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	2
168	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	8
168	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	3
168	0	Insecta	Diptera	Chironomidae	Tanytarsini	Cladotanytarsus	Cladotanytarsus	1
168	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
168	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	2
168	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	2
168	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	1
168	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	4
168	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	24
168	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	1
168	0	Insecta	Plecoptera	Capniidae		Capniidae	Capniidae	1
168	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	2
168	0	Insecta	Plecoptera	Nemouridae		Nemouridae	Nemouridae	1
168	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	2
168	0	Insecta	Plecoptera	Plecoptera		Plecoptera	Plecoptera	2
168	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	3
168	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	2
168	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	2
168	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	2

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
168	0	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	1
168	1	Clitellata	Haplotaxida	Naididae		Nais	Nais bretscheri	2
168	1	Insecta	Coleoptera	Dytiscidae		Dytiscidae	Dytiscidae	1
168	1	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	21
168	1	Insecta	Diptera	Chironomidae		Brillia	Brillia	1
168	1	Insecta	Diptera	Chironomidae		Parakiefferiella	Parakiefferiella	3
168	1	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	3
168	1	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	4
168	1	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	4
168	1	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	4
168	1	Insecta	Diptera	Chironomidae		Trissopelopia	Trissopelopia	2
168	1	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	3
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Cladotanytarsus	Cladotanytarsus	1
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Corynoneura	Corynoneura	7
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	2
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	6
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Stempellinella	Stempellinella	2
168	1	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsus	Tanytarsus	2
168	1	Insecta	Diptera	Empididae		Clinocera	Clinocera	1
168	1	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	1
168	1	Insecta	Diptera	Tipulidae		Antocha	Antocha	2
168	1	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	9
168	1	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	16
168	1	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	2
168	1	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	3
168	1	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	3
168	1	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	3
168	1	Insecta	Trichoptera	Rhyacophilidae		Rhyacophila	Rhyacophila	3
169	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	3
169	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	7
169	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
169	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	2
169	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus	1
169	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus/Cricotopus	5
169	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	5

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
169	0	Insecta	Diptera	Chironomidae		Stilocladius	Stilocladius	1
169	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	2
169	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
169	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	5
169	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
169	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	3
169	0	Insecta	Diptera	Simuliidae		Prosimulium	Prosimulium	3
169	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	1
169	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	39
169	0	Insecta	Ephemeroptera	Heptageniidae		Heptageniidae	Heptageniidae	1
169	0	Insecta	Ephemeroptera	Heptageniidae		Stenonema	Stenonema	3
169	0	Insecta	Megaloptera	Corydalidae		Corydalus	Corydalus	1
169	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	1
169	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	5
169	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	13
169	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	5
169	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	2
170	0	Clitellata	Haplotaxida	Naididae		Nais	Nais bretscheri	1
170	0	Insecta	Coleoptera	Elmidae		Optioservus	Optioservus	1
170	0	Insecta	Coleoptera	Elmidae		Oulimnius	Oulimnius	5
170	0	Insecta	Coleoptera	Elmidae		Stenelmis	Stenelmis	1
170	0	Insecta	Diptera	Chironomidae		Diamesa	Diamesa	1
170	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius	3
170	0	Insecta	Diptera	Chironomidae		Orthocladius	Orthocladius/Cricotopus	2
170	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	4
170	0	Insecta	Diptera	Chironomidae		Rheocricotopus	Rheocricotopus	1
170	0	Insecta	Diptera	Chironomidae		Sympotthastia	Sympotthastia	2
170	0	Insecta	Diptera	Chironomidae		Thienemanniella	Thienemanniella	1
170	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	1
170	0	Insecta	Diptera	Chironomidae		Tvetenia	Tvetenia	7
170	0	Insecta	Diptera	Chironomidae	Tanytarsini	Microtendipes	Microtendipes	1
170	0	Insecta	Diptera	Chironomidae	Tanytarsini	Paratanytarsus	Paratanytarsus	1
170	0	Insecta	Diptera	Chironomidae	Tanytarsini	Rheotanytarsus	Rheotanytarsus	2
170	0	Insecta	Diptera	Chironomidae	Tanytarsini	Sublettea	Sublettea	2
170	0	Insecta	Diptera	Chironomidae	Tanytarsini	Tanytarsini	Tanytarsini	2
170	0	Insecta	Diptera	Empididae		Chelifera	Chelifera	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
170	0	Insecta	Diptera	Simuliidae		Simuliidae	Simuliidae	1
170	0	Insecta	Diptera	Tipulidae		Antocha	Antocha	1
170	0	Insecta	Ephemeroptera	Baetidae		Baetidae	Baetidae	1
170	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerella	Ephemerella	1
170	0	Insecta	Ephemeroptera	Ephemerellidae		Ephemerellidae	Ephemerellidae	17
170	0	Insecta	Megaloptera	Corydalidae		Nigronia	Nigronia	2
170	0	Insecta	Plecoptera	Nemouridae		Prostoia	Prostoia	6
170	0	Insecta	Plecoptera	Perlidae		Acroneuria	Acroneuria	2
170	0	Insecta	Plecoptera	Taeniopterygidae		Taenionema	Taenionema	2
170	0	Insecta	Trichoptera	Hydropsychidae		Cheumatopsyche	Cheumatopsyche	15
170	0	Insecta	Trichoptera	Hydropsychidae		Hydropsyche	Hydropsyche	14
170	0	Insecta	Trichoptera	Philopotamidae		Chimarra	Chimarra	8
170	0	Insecta	Trichoptera	Uenoidae		Neophylax	Neophylax	7
171	0	Insecta	Coleoptera	Dytiscidae		Helichus	Helichus	1
171	0	Insecta	Diptera	Ceratopogonidae		Bezzia/Palpomyia	Bezzia/Palpomyia	1
171	0	Insecta	Diptera	Ceratopogonidae		Ceratopogon	Ceratopogon	1
171	0	Insecta	Diptera	Ceratopogonidae		Culicoides	Culicoides	1
171	0	Insecta	Diptera	Chironomidae		Brundiniella	Brundiniella	1
171	0	Insecta	Diptera	Chironomidae		Chaetocladius	Chaetocladius	1
171	0	Insecta	Diptera	Chironomidae		Heterotrissocladius	Heterotrissocladius	9
171	0	Insecta	Diptera	Chironomidae		Larsia	Larsia	2
171	0	Insecta	Diptera	Chironomidae		Orthoclaadiinae	Orthoclaadiinae	2
171	0	Insecta	Diptera	Chironomidae		Orthocladus	Orthocladus	1
171	0	Insecta	Diptera	Chironomidae		Paralauterborniella	Paralauterborniella	1
171	0	Insecta	Diptera	Chironomidae		Parametricnemus	Parametricnemus	35
171	0	Insecta	Diptera	Chironomidae		Polypedilum	Polypedilum	2
171	0	Insecta	Diptera	Chironomidae		Psilometriocnemus	Psilometriocnemus	1
171	0	Insecta	Diptera	Chironomidae		Thienemannimyia	Thienemannimyia	8
171	0	Insecta	Diptera	Chironomidae	Tanytarsini	Micropsectra	Micropsectra	5
171	0	Insecta	Diptera	Psychodidae		Pericoma	Pericoma	1
171	0	Insecta	Diptera	Sciaridae		Sciaridae	Sciaridae	1
171	0	Insecta	Diptera	Tipulidae		Hexatoma	Hexatoma	1
171	0	Insecta	Diptera	Tipulidae		Limnophila	Limnophila	2
171	0	Insecta	Diptera	Tipulidae		Pseudolimnophila	Pseudolimnophila	1
171	0	Insecta	Plecoptera	Nemouridae		Amphinemura	Amphinemura	6
171	0	Insecta	Plecoptera	Perlodidae		Isoperla	Isoperla	1

StationID	RepNum	Class	Order	Family	Tribe	Genus	Final ID	Individuals
171	0	Insecta	Trichoptera	Hydropsychidae		Diplectrona	Diplectrona	6
171	0	Insecta	Trichoptera	Limnephilidae		Limnephilidae	Limnephilidae	1
171	0	Oligochaeta	Tubificida	Enchytraeidae		Enchytraeidae	Enchytraeidae	3
171	0	Pelecypoda	Veneroidea	Pisidiidae		Pisidium	Pisidium	4

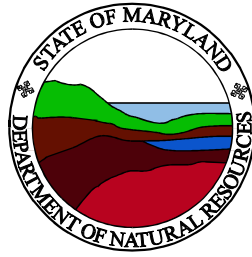
APPENDIX B: Biological Metrics

StationID	121	122	123	124	125	126	127	128	129	130	125QC
Waterbody Name	Middle Patuxent	UT to Middle Patuxent	Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent
Collection Date	03-25-2002	03-25-2002	03-14-2002	03-19-2002	03-15-2002	03-19-2002	03-15-2002	03-18-2002	03-25-2002	03-11-2002	03-15-2002
CP/NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP
Index	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
Order	4	1	3	3	1	4	2	1	4	1	1
IBI-Spring-MBSS-NCP	3.44	2.11	3.44	4.33	2.78	3.22	3.44	3.22	3.22	3.00	3.00
Rating-Spring-MBSS-NCP	Fair	Poor	Fair	Good	Poor	Fair	Fair	Fair	Fair	Fair	Fair
Total Taxa	36	22	42	36	28	31	40	38	36	30	35
Total Taxa Score	5	3	5	5	5	5	5	5	5	5	5
EPT Taxa	11	0	9	15	5	10	6	6	10	9	6
EPT Taxa Score	3	1	3	5	3	3	3	3	3	3	3
Ephemeroptera Taxa	3	0	4	7	1	3	2	2	3	2	1
Ephemeroptera Taxa Score	3	1	3	5	1	3	3	3	3	3	1
Diptera Taxa	21	16	24	18	20	15	26	25	19	18	23
Diptera Taxa Score	5	5	5	5	5	5	5	5	5	5	5
Ephemeroptera Percent	13.04	0	10.48	22.77	2.56	6.38	12.87	2.78	6.48	5.66	2.91
Ephemeroptera Percent Score	3	1	3	5	1	3	3	1	3	1	1
Tanytarsini Percent	6.96	1.00	7.62	4.95	4.27	3.19	13.86	17.59	4.63	4.72	12.62
Tanytarsini Percent Score	5	3	5	5	3	3	5	5	3	3	5
Intolerant Taxa	8		3	6	6	5	6	8	7	8	8
Intolerant Taxa Score	3	1	3	3	3	3	3	3	3	3	3
Tolerant Percent	15.65	13.00	16.19	6.93	26.50	15.96	15.84	20.37	13.89	25.47	21.36
Tolerant Percent Score	3	3	3	5	3	3	3	3	3	3	3
Collector Percent	1.74	7.00			5.13		5.94	2.78	1.85	0.94	11.65
Collector Percent Score	1	1	1	1	1	1	1	1	1	1	1
Total Individuals	115	100	105	101	117	94	101	108	108	106	103
Mean Score	3.22										
Standard Deviation	0.564131341										

StationID	141	142	143	144	145	146	147	148	149	150	146QC
Waterbody Name	UT to Middle Patuxent	UT to Middle Patuxent	Middle Patuxent	Middle Patuxent	Middle Patuxent	Ut to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Ut to Middle Patuxent
Collection Date	03-12-2002	03-12-2002	03-08-2002	03-08-2002	03-08-2002	03-07-2002	03-07-2002	03-18-2002	03-18-2002	03-14-2002	03-07-2002
CP/NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP
Index	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
Order	1	1	3	3	3	1	1	2	2	1	1
IBI-Spring-MBSS-NCP	3.67	3.89	3.66	3.44	4.11	3.67	3.22	3.44	3.44	3.22	3.67
Rating-Spring-MBSS-NCP	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair	Fair	Fair
Total Taxa	26	45	29	23	38	29	28	28	43	43	34
Total Taxa Score	5	5	5	5	5	5	5	5	5	5	5
EPT Taxa	6	11	12	11	13	10	7	6	5	5	12
EPT Taxa Score	3	3	3	3	5	3	3	3	3	3	3
Ephemeroptera Taxa	3	3	4	3	3	3	3	3	3	2	4
Ephemeroptera Taxa Score	3	3	3	3	3	3	3	3	3	3	3
Diptera Taxa	14	25	11	8	20	13	19	15	27	32	17
Diptera Taxa Score	5	5	5	3	5	5	5	5	5	5	5
Ephemeroptera Percent	51.92	16.26	20.39	37.5	17	8.65	4.21	17.14	5.71	3.54	16.67
Ephemeroptera Percent Score	5	3	5	5	3	3	1	3	3	1	3
Tanytarsini Percent	1.92	11.38	2.91	0.96	5.00	6.73	11.58	2.86	11.43	15.93	7.41
Tanytarsini Percent Score	3	5	3	3	5	5	5	3	5	5	5
Intolerant Taxa	6	12	7	6	9	7	6	8	6	4	10
Intolerant Taxa Score	3	5	3	3	5	3	3	3	3	3	5
Tolerant Percent	7.69	9.76	0.97	0.00	10.00	5.77	45.26	4.76	31.43	21.24	15.74
Tolerant Percent Score	5	5	5	5	5	5	3	5	3	3	3
Collector Percent	3.85		2.91	6.73	4.00		2.11	10.48	2.86	0.88	
Collector Percent Score	1	1	1	1	1	1	1	1	1	1	1
Total Individuals	104	123	103	104	100	104	95	105	105	113	108
Mean Score	3.58										
Standard Deviation	0.281101596										

StationID	161	163	164	167	168	169	170	171	168QC
Waterbody Name	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	UT to Middle Patuxent	Terrapin Branch	Middle Patuxent	Middle Patuxent	Ut to Middle Patuxent	Terrapin Branch
Collection Date	03-06-2002	03-06-2002	03-13-2002	03-13-2002	03-12-2002	03-11-2002	03-08-2002	03-14-2002	03-12-2002
CP/NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP	NCP
Index	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
Order	1	2	1	1	1	3	3	1	1
IBI-Spring-MBSS-NCP	2.56	3.67	3.22	3.22	4.33	3.67	3.67	2.78	4.11
Rating-Spring-MBSS-NCP	Poor	Fair	Fair	Fair	Good	Fair	Fair	Poor	Good
Total Taxa	29	25	41	37	29	24	32	27	28
Total Taxa Score	5	5	5	5	5	5	5	5	5
EPT Taxa	1	7	10	7	13	9	10	4	7
EPT Taxa Score	1	3	3	3	5	3	3	1	3
Ephemeroptera Taxa		2	2		3	4	3		4
Ephemeroptera Taxa Score	1	3	3	1	3	3	3	1	3
Diptera Taxa	18	13	25	23	12	12	17	20	18
Diptera Taxa Score	5	5	5	5	5	5	5	5	5
Ephemeroptera Percent	0	11.11	1.75	0	29.29	39.64	16.38	0	26.79
Ephemeroptera Percent Score	1	3	1	1	5	5	3	1	5
Tanytarsini Percent	8.57	7.07	5.26	0.87	6.06	3.60	6.90	5.05	18.75
Tanytarsini Percent Score	5	5	5	3	5	3	5	5	5
Intolerant Taxa	2	4	8	10	8	5	8	5	5
Intolerant Taxa Score	1	3	3	5	3	3	3	3	3
Tolerant Percent	46.67	5.05	21.93	8.70	4.04	2.70	0.86	14.14	8.04
Tolerant Percent Score	3	5	3	5	5	5	5	3	5
Collector Percent		4.04			18.18	6.31	4.31		18.75
Collector Percent Score	1	1	1	1	3	1	1	1	3
Total Individuals	105	99	114	115	99	111	116	99	112
Mean Score	3.39								
Standard Deviation	0.566557724								

APPENDIX C: Field Audit Reports



Parris N. Glendening
Governor

Maryland Department of Natural Resources

J. Charles Fox
Secretary

Kathleen Kennedy-Townsend
Lt. Governor

Tawes State Office Building
Annapolis, Maryland 21401

Karen M. White
Deputy Secretary

19 April 2002

MEMORANDUM

FROM: Paul Kazyak

TO: QC file; Ron Klauda

SUBJECT: Spring index period field QC audits with Tetra Tech field crews

On 8 March and 15 March 2002, I conducted field audits with Tetra Tech crews who are using methods similar to MBSS. This memo documents my findings.

On 8 March, I accompanied Marcus Bowersox (Tt) and Sharon Meigs (PG County) as they sampled Cattail Branch (PG County site 19-033A) and an unnamed tributary to Lower Beaverdam Creek (PG County site 19-040B). Neither person attended MBSS training in 2002- one of our pre-requisites for persons collecting MBSS data.

During my visit, I verified that the crew had a first aid kit, and checked their site coordinates against mine and found exactly the same reading. I liked the use of permanent marking plates nailed to trees to mark the site - we may want to consider this practice for our sentinel site network.

Although we do not collect Hydrolab data during spring, I checked the crew's Hydrolab calibration logbook as a courtesy. For pH, the pre-calibration reading of the pH 7 buffer varied from 6.4 to 7.2. The degree of variability recorded on successive days is unusual and may indicate a bad probe. During Hydrolab use, I observed that the probe was held downstream from the feet of the sampler- this practice could influence readings of pH, DO and possibly conductivity.

One of the streams being sampled (Cattail Branch) was small but had several deeper areas which appeared too deep for the hip boots being worn by the crew. During spring, I recommend that chest waders be routinely worn to allow access to portions of sites too deep for hip boots. In some cases, elevated water in the floodplain could force samplers in hip boots to confine themselves to portions of the stream channel that would not normally have water- a significant potential influence on BIBI scores. Before and after benthic sampling was conducted at each site, I inspected the benthic 'd' net and it was fully intact and contained no stray organisms from a previous site.

During layout of the site at Cattail Branch, the crew did not follow the thalweg of the stream closely because of the excessive growth of multiflora rose and other vegetation. Because electrofishing will not be conducted at this site (PG County does not electrofish 1st order streams), the impact of a segment length other than the targeted 100 meters on BIBI score is minimal, in my opinion. However, for those sites in the county where electrofishing is conducted, abundance of fishes could be overestimated.

Sortate from the site was collected in 5 one liter containers, each filled to the top with debris (mostly organic). If samples are stored for any length of time, there is a definite possibility of losing samples because of insufficient preservation. I was assured that samples are sorted promptly, and that sample preservation has not been an issue in the past.

Because only spring sampling is conducted in first order streams that are selected by PG County, the crew conducts the entire MBSS habitat assessment during the spring visit. As flows vary considerably between summer low flow and spring, I consider spring habitat assessments to be difficult to extrapolate to summer conditions (the time specified in the MBSS sampling manual). As a result, habitat information needs to be carefully interpreted and direct application of results is problematic in my view. As a measure of variability, I recorded my guess at what summer habitat scores would look like at Cattail Branch:

Instream Habitat	10
Epifaunal Substrate	6
Velocity-Depth Diversity	11
Pool Quality	14 (67 meters extent)
Riffle Quality	6 (8 meters extent)
Embeddedness	100%
Shading	68%
Trash rating	2

I did not compare my scores with the field crew, but it may be useful to do that at some point.

The crew also characterized stream velocity by choosing a representative area and timing a floating object over an estimated 3 foot distance (3 repetitions). Interestingly, the crew only estimated the distance traveled but recorded the elapsed time to the nearest 100th second. This implies a degree of accuracy that appeared unrealistic to me, especially when BPJ was used to select the sampling location.

The crew also did a 100 particle pebble count within the site by using 10 ~equally spaced transects and 10 particles from each transect. One issue of concern for me was estimation of bankfull width and the potential effect on the pebble count. In that stream, the relative homogeneity of substrate types likely minimized any effect of incorrectly identifying the bankfull location, but this estimate could have important consequences for us elsewhere in the state. If MBSS decides at some point to begin using pebbles counts, we will need in-depth training in the definition of 'bankfull'.

On a lighter note, I observed a large number of beer 'species' at the site (18), including 8 different malt liquors (a personal best).

On 15 March, I accompanied Kristen Pavlik and her assistant Colin while they sampled an unnamed tributary to the Patuxent River (MPAX-127), a random site selected as part of Howard County's 2002 stream monitoring program. Kristen attended spring 2002 MBSS training, so at least one person on the crew met the requirement that we established for our staff. The crew had a first aid kit, but it was in their vehicle rather than in their backpack. For obvious reasons, we recommend that first aid kits be carried into the field.

The target coordinates (deg min sec) for the site were: 39 11 21.2 Lat 76 56 11.9 Lon
and the coordinates I got while at their midpoint were: 39 11 19 76 56 15

– in the vicinity but 2-3 seconds different in precise location. This level of difference is unlikely to create large problems, but could cause the site to be located on a different landowner's property. While we were at the site, several neighbors/landowners walked by and I got the impression that none were aware of that the crew was given permission to sample- if the crew leader had a record of who exactly was contacted by phone or signed a consent form, potential problems with irate landowners could be avoided. In this case, all parties were friendly and curious (more typical of suburbs rather than farmland).

During the visit, I learned that Howard County is responsible for securing landowner permissions. During navigation to the site, we crossed several properties- I mentioned that having detailed information on who was called, date of the call, etc., could save grief from a landowner or relative who questioned whether the crew had secured permission. I also suggested that landowners might like to have a card with the Howard County website (for stream information, with instructions how to access information from their site), along with a link to the MBSS webpage.

As Howard County does not currently conduct fish sampling, the crew recorded MBSS habitat metrics for both spring and summer on 15 March (and neither crew member had attended MBSS summer index period training. As with the PG crew, the Howard crew approximated the thalweg when measuring the site, but this practice will have minimal effect on the data since no fish sampling is done for the county. I also have comments similar to those made above for stream velocity, bankfull estimation. As a final note, the crew recorded habitat metric scores while standing at or near the midpoint and the assessment was more rapid than typical MBSS sites. I recommend that the crew walk the segment several times during the habitat evaluation to get a better picture of conditions as they record. MBSS crews also take advantage of flagging at the 25 and 50 meter locations to help in assessing proportions/percentages.

Field Audits – Spring 2002 – PG & Howard Counties

Field audits are an integral part of the training and retraining of field crews. Done to make sure that all procedures are being carried out as described in the relevant SOPs. Audits are performed by a qualified individual with over 5 years of experience in sampling as a crew leader.

The auditor is familiar with the SOPs, does not act as a crew member during visit but is present as an observer only. If field teams do not complete any task as outlined in the SOP notes are made as to the discrepancies and reasons for the discrepancies. Sometimes the discrepancies are necessary due to field conditions and do not affect the quality of the sample (e.g., not recording flow direction on the site map). Other discrepancies could potentially affect the quality of the samples (e.g., not picking all organisms off of the net before leaving the sampling site).

Prince George's County

The audit of the Prince George's County team was conducted by Erik Leppo on March 12, 2002 at Station 10-017A, New Stop Branch. The field team was comprised of Marcus Bowersox (team leader), Jennifer Pitt (team member), and Sharon Meigs (client).

Only minor discrepancies were noted during the field audit for this field crew. None could potentially affect the quality of the sampling. All discrepancies are listed below:

- Need to carry USGS quad map into the field for verification of sampling location. It was checked at the vehicle but not used on-site.
- Flow direction was recorded on the site map but was not indicated as such. It was recommended that the word "Flow" be written next to the arrow to distinguish the arrow from the arrow for locating North.
- More care should be given to RBP habitat sheets to keep streams in comparison to the descriptions on the datasheets rather than from one stream to another. Just because one stream is better than another does not mean it should be rated higher on each category.
- Internal pre-printed benthic sample labels had 2001 as the year. This was pointed out by the auditor and was corrected. Notes on the chain-of-custody sheets were made to alert the lab as to which previously collected samples still needed correction.
- Sand card was not used by the person doing the pebble count. It was noted that in the future the data collector would have the sand card on person for reference.
- More care should be taken not impact the section of stream where the cross section transect is to be measured, prior to and during measurement.

- Chain-of-custody form not kept in plastic as per SOP. This was corrected.

Howard County

The audit of the Howard County team was conducted by Erik Leppo on March 12, 2002 at Station 141, Unnamed Tributary to Middle Patuxent River. The field team was comprised of Kristen Pavlik (team leader) and Colin Hill (team member).

Only minor discrepancies were noted during the field audit for this field crew. None could potentially affect the quality of the sampling. All discrepancies are listed below:

- More attention needed to be paid to the numerical calculations on the RBP habitat data sheet rather than giving scores based on the narrative.
- Cross-sections need to be carried out farther on each bank to try and capture flood prone features.
- When measuring canopy cover thought should be given as to how cover is affected by time of day.
- First-aid kit needs to be carried into the field where it will be needed rather than stored in the vehicle (even when the vehicle is only a short distance away).
- More care in filling sample jars with alcohol so that air pockets do not remain in the sample which could potentially cause the sample to be improperly preserved.
- Pebble count transects need to be sampled in proportion to available features per SOP.
- For cross-section benchmarks bearing and distance to monument should be recorded on tree tags (not just on datasheets).
- More care should be taken not impact the section of stream where the cross section transect is to be measured, prior to and during measurement.
- Chain-of-custody form not kept in plastic as per SOP. This was corrected.

APPENDIX D: Physical Habitat Metrics

StationID	121	122	123	124	125	126	127	128	129	130	125QC
Collection Date	03-25-2002	03-25-2002	03-14-2002	03-19-2002	03-15-2002	03-19-2002	03-15-2002	03-18-2002	03-25-2002	03-11-2002	03-15-2002
Total Habitat Score	117	88	132	117	139	119	106	132	121	103	116
Percent Compared to Maximum	58.5	44	66	58.5	69.5	59.5	53	66	60.5	51.5	58
Narrative Category	Non Supporting	Non Supporting	Partially Supporting	Non Supporting	Partially Supporting	Non Supporting	Non Supporting	Partially Supporting	Partially Supporting	Non Supporting	Non Supporting
Bank Stability (Left Bank)	4	3	6	5	8	4	5	7	6	7	6
Bank Stability (Right Bank)	4	3	6	2	8	4	5	7	6	7	6
Channel Alteration	16	15	15	17	16	16	16	17	16	11	14
Channel Flow Status	11	7	15	7	9	11	9	13	9	10	10
Embeddedness	9	7	10	13	12	10	10	11	10	8	12
Epifaunal Substrate/ Available Cover	12	7	13	14	15	10	13	12	12	9	12
Frequency of Riffles (or bends)	11	13	15	14	17	14	12	15	11	11	15
Riparian Vegetative Zone Width (Left Bank)	8	5	8	9	4	9	5	7	9	5	3
Riparian Vegetative Zone Width (Right Bank)	9	4	8	9	9	9	2	6	6	5	4
Sediment Deposition	9	6	8	7	13	9	10	13	8	10	10
Vegetative Protection (Left Bank)	4	3	6	3	6	5	5	6	6	6	5
Vegetative Protection (Right Bank)	4	3	6	2	6	5	4	6	6	6	5
Velocity/Depth Regime	16	12	16	15	16	13	10	12	16	8	14
Mean Habitat Score	117.4										
Mean % Compared to Maximum	0.587										
Standard Deviation	15.31303004										

StationID	141	142	143	144	145	146	147	148	149	150	146QC
Collection Date	03-12-2002	03-12-2002	03-08-2002	03-08-2002	03-08-2002	03-07-2002	03-07-2002	03-18-2002	03-18-2002	03-14-2002	03-07-2002
Total Habitat Score	113	107	109	125	82	105	92	110	120	93	93
Percent Compared to Maximum	56.5	53.5	54.5	62.5	41	52.5	46	55	60	46.5	46.5
Narrative Category	Non Supporting	Non Supporting	Non Supporting	Partially Supporting	Non Supporting	Non Supporting	Non Supporting	Non Supporting	Partially Supporting	Non Supporting	Non Supporting
Bank Stability (Left Bank)	4	6	3	5	2	5	6	5	6	2	5
Bank Stability (Right Bank)	4	6	2	3	2	5	6	5	6	4	5
Channel Alteration	17	16	17	17	11	15	16	16	17	16	14
Channel Flow Status	10	11	10	14	12	8	7	9	12	7	6
Embeddedness	9	9	12	10	7	14	6	10	7	6	13
Epifaunal Substrate/ Available Cover	12	10	11	12	11	11	7	9	11	11	10
Frequency of Riffles (or bends)	17	12	9	12	6	15	7	11	12	12	11
Riparian Vegetative Zone Width (Left Bank)	3	6	9	9	2	2	6	6	7	1	2
Riparian Vegetative Zone Width (Right Bank)	5	3	8	8	2	3	2	8	8	9	2
Sediment Deposition	12	8	10	11	7	13	12	9	9	6	11
Vegetative Protection (Left Bank)	4	6	3	5	2	4	5	5	6	2	3
Vegetative Protection (Right Bank)	4	6	2	5	2	4	5	5	6	4	3
Velocity/Depth Regime	12	8	13	14	16	6	7	12	13	13	8
Mean Habitat Score	105.6										
Mean % Compared to Maximum	0.528										
Standard Deviation	13.21783307										

StationID	161	162	163	164	166	167	168	169	170	171	168QC
Collection Date	03-06-2002	03-06-2002	03-06-2002	03-13-2002	03-13-2002	03-13-2002	03-12-2002	03-11-2002	03-08-2002	03-14-2002	03-12-2002
Total Habitat Score	76	74	134	119	73	103	113	129	115	84	114
Percent Compared to Maximum	38	37	67	59.5	36.5	51.5	56.5	64.5	57.5	42	57
Narrative Category	Non Supporting	Non Supporting	Partially Supporting	Non Supporting	Non Supporting	Non Supporting	Non Supporting	Partially Supporting	Non Supporting	Non Supporting	Non Supporting
Bank Stability (Left Bank)	2	6	5	5	6	5	6	6	4	6	5
Bank Stability (Right Bank)	2	6	5	5	6	5	6	4	2	6	6
Channel Alteration	14	16	18	17	17	15	14	16	17	16	16
Channel Flow Status	11	0	16	10	0	9	10	13	14	5	12
Embeddedness	8	5	11	10	5	8	11	14	12	4	10
Epifaunal Substrate/ Available Cover	10	7	9	11	5	7	13	13	13	5	13
Frequency of Riffles (or bends)	8	7	14	14	8	12	13	14	10	5	14
Riparian Vegetative Zone Width (Left Bank)	1	6	9	9	3	8	2	9	9	8	2
Riparian Vegetative Zone Width (Right Bank)	1	6	9	9	5	7	3	9	5	8	2
Sediment Deposition	8	3	13	7	6	10	11	11	10	5	9
Vegetative Protection (Left Bank)	1	6	6	5	6	5	6	5	4	5	5
Vegetative Protection (Right Bank)	1	6	6	5	6	5	6	5	2	5	6
Velocity/Depth Regime	9	0	13	12	0	7	12	10	13	6	14
Mean Habitat Score	102										
Mean % Compared to Maximum	0.51										
Standard Deviation	23.47102232										

APPENDIX E: Station Locations

Site	WaterbodyName	Location	Lat	Long
121	Middle Patuxent	between 14&15th hole on golf course, down dirt/grass path to reach	39.222306	-76.912361
122	UT to Middle Patuxent	522b Wilson Bottom service road, down path and 150m to reach	39.224806	-76.894972
123	Middle Patuxent	access 6500 Welcome night path down hill 200m to reach	39.195528	-76.933170
124	UT to Middle Patuxent	access 6644 Towery Oak Path ~ 150m into woods to reach	39.203167	-76.907250
125	UT to Middle Patuxent	end of circle @ Harmerl Dr.~ 100m into woods to reach	39.198610	-76.896390
125QC	UT to Middle Patuxent	end of circle @ Harmerl Dr.~ 100m into woods to reach	39.198610	-76.896390
126	Middle Patuxent	~200m into woods behind houses on Towering Oak Path	39.202194	-76.905222
127	UT to Middle Patuxent	up private drive ~300m from 6400 blk of Guilford Rd.	39.189222	-76.936639
128	UT to Middle Patuxent	off RT 108 ~ 100m down driveway@~13050 blk	39.186000	-76.954694
129	Middle Patuxent	10861 Braeburn Ct ~ 300m to reach	39.191111	-76.897194
130	UT to Middle Patuxent	exit ramp of MD Welcome center - toward exit end of fence, down hill to stream	39.142194	-76.847500
141	UT to Middle Patuxent	3500 blk Folly Quarter, 1st stream crossing on Farm Drive	39.275361	-76.910278
142	UT to Middle Patuxent	3500 blk of Folly Quarter, into Holly House from drive, 2nd stream crossing drive and main entrance	39.277639	-76.911444
143	Middle Patuxent	350m DS of #170-off Triadelphia Mill Rd.	39.282250	-76.934861
144	Middle Patuxent	off Etchison Dr. long driveway after Heathcliff ~10m to reach behind house and ask permission	39.277028	-76.932528
145	Middle Patuxent	in UM Ag field-driveway next to stream crossing Folly Quarter Rd. 140m to reach	39.257639	-76.929167
146	Ut to Middle Patuxent	off Heritage Hill Rd 150m into woods to stream	39.254583	-76.952280
146QC	Ut to Middle Patuxent	off Heritage Hill Rd 150m into woods to stream	39.254583	-76.952280
147	UT to Middle Patuxent	off Heritage Hill ~ 180m in to corn field to stream	39.250500	-76.946861
148	UT to Middle Patuxent	Brick House Farm property-access through fields 300m	39.239194	-76.940500
149	UT to Middle Patuxent	house at end of drive on Brick House Farm property~320m to reach	39.238389	-76.939667
150	UT to Middle Patuxent	5300 blk Shppard Ln-access@bridge~150m to reach	39.227528	-76.935444
161	UT to Middle Patuxent	just beyond pond in house farm off McKendrie-ask permission drive down and into field	39.316722	-76.988028
163	UT to Middle Patuxent	Park in field large house ask permission~ 2500 blk of Pfefferkorn Rd.	39.299667	-76.980333
164	UT to Middle Patuxent	private drive 12026 lamp lighters Dr. ~160m into woods to reach	39.304639	-76.926639
167	UT to Middle Paxtuent	follow 1st drive after 70 on Sand hill to house-120m into woods to reach	39.306278	-76.936167
168	Terrapin Branch	bride crossing drive @Nixon's Farm	39.295110	-76.955000
168QC	Terrapin Branch	bride crossing drive @Nixon's Farm	39.295110	-76.955000
169	Middle Patuxent	in driveway off Elbicare Ct, follow drive to park~ 230m into woods to reach	39.284361	-76.945806
170	Middle Patuxent	stream crossing @Triadelphia Mill 100m into woods to reach	39.281944	-76.939111
171	Ut to Middle Patuxent	off 144 Dawn Angus Farm entrance, onto gravel road 400m through fields to reach	39.306778	-76.977389

APPENDIX F: Wolman Pebble Count

StationID	CollDate	Silt/Clay	Sand	HardPan Clay	Gravel	Cobble	Boulder	Bedrock
121	03-25-2002	28	55	1	16			
122	03-25-2002	23	41		32	4		
123	03-14-2002	21	24		38	14	3	
124	03-19-2002	33	26		27	7	7	
125	03-15-2002	1	46		21	10	22	
126	03-19-2002	17	42		26	14	1	
127	03-15-2002	29	52		13	6		
128	03-18-2002	26	24		38	9	3	
129	03-25-2002	15	43		39		3	
130	03-11-2002	2	48		25	12	10	3
141	03-12-2002	32	51		16	1		
142	03-12-2002	24	33		33	10		
143	03-08-2002	11	27		46	16		
144	03-08-2002	9	29		38	15	1	8
145	03-08-2002	32	33		22	11	2	
146	03-07-2002	3	79		16	1	1	
147	03-07-2002	36	58		6			
148	03-18-2002	8	69		18	5		
149	03-18-2002	27	51		22			
150	03-14-2002	23	46		26	5		
161	03-06-2002	49	43		6	2		
163	03-06-2002	7	51		19	5	18	
164	03-13-2002	30	54		13	3		
167	03-13-2002	34	33		12	16	1	4
168	03-12-2002	21	30		35	10	4	
169	03-11-2002		14		31	44	11	
170	03-08-2002	21	18		35	23	3	
171	03-14-2002	73	27					

APPENDIX G: Water Chemistry

StationID	CollDate	Conductivity (μ mho/cm)	Dissolved Oxygen (mg/l)	pH (SU)	Stream Flow, Instant (sec/m)	Water Temperature ($^{\circ}$ C)
121	03-25-2002	251.20	12.96	7.21	0.50	6.21
122	03-25-2002	248.00	12.33	6.76	0.06	13.55
123	03-14-2002	177.20	13.63	7.17	0.33	10.82
124	03-19-2002	231.40	12.49	6.99	0.20	7.25
125	03-15-2002	279.00	10.88	6.98	0.25	14.47
125	03-15-2002	284.60	10.48	7.01	0.10	14.75
125QC	03-19-2002	242.70	12.52	7.21	0.11	8.41
127	03-15-2002	164.50	11.86	6.96	0.17	8.33
128	03-18-2002	140.70	11.04	6.00	0.06	7.57
129	03-25-2002	240.00	14.09	7.41	0.17	7.84
130	03-11-2002	303.70	13.12	6.84	0.10	7.42
141	03-12-2002	259.50	13.60	7.67	0.25	5.52
142	03-12-2002	244.60	13.29	7.25	0.06	4.23
143	03-08-2002	226.30	13.69	6.83	0.17	10.78
144	03-08-2002	228.10	13.54	6.77	0.20	7.55
145	03-08-2002	229.30	13.15	6.68	0.20	5.63
146	03-07-2002	219.70	8.80	6.61	0.06	11.61
146QC	03-07-2002	259.40	10.94	6.44	0.06	9.94
147	03-07-2002	236.80	10.05	6.60	0.13	9.45
148	03-18-2002	373.80	13.81	7.86	0.11	9.07
149	03-18-2002	377.60	12.86	7.55	0.25	8.31
150	03-14-2002	327.00	14.25	8.06	0.11	14.19
161	03-06-2002	237.30	12.83	6.60	0.20	7.34
163	03-06-2002	267.70	13.69	6.58	0.09	1.41
164	03-13-2002	271.60	11.84	6.57	0.17	6.69
167	03-13-2002	925.00	10.59	6.45	0.05	8.26
168	03-12-2002	532.80	13.94	7.17	0.33	7.19
168QC	03-12-2002	531.90	13.54	7.26	0.33	7.74
169	03-11-2002	232.20	13.51	6.66	0.20	3.71
170	03-08-2002	221.70	13.92	6.80	0.25	9.87
171	03-14-2002	247.10	11.31	6.99	0.13	8.22