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Upper Susquehanna Subbasin Survey

Small Watershed Study

Monitoring Report No. 1A
Oct. 1, 1999 through Aug. 31, 2000

Susquehanna River Basin Commission

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Introduction

The Susquehanna River Basin Commission (SRBC) conducts a water quality and biological assessment of each of the six major subbasins (Figure 1) approximately every 10 years on a rotating schedule. The SRBC assessment has provided information used to:

- Evaluate the chemical, biological, and habitat conditions of streams in the basin;
- Identify major sources of pollution and lengths of stream impacted;
- Maintain a database that can be used to document changes in stream quality over time;
- Review projects affecting water quality in the basin; and
- Identify areas for more intensive study.

Initally, SRBC's subbasin surveys were based on a single, "broad, brush stroke" sampling effort, providing results from one year of sampling in each subbasin. All sampling was performed during the summer under relatively stable flow conditions. Starting with this most current assessment of the Upper Susquehanna Subbasin, SRBC changed the format to include a second, intensive year of sampling that focuses on specific areas of impairment in each subbasin and/or provides current data to local watershed groups for remediation or conservation efforts.

The following report contains information concerning data collected for the Small Watershed Study during the second year of the Upper Susquehanna Subbasin Survey. SRBC publication No. 203, entitled Upper Susquehanna Subbasin: A Water Quality and Biological Assessment (Stoe, 1999), contains information from the first year of sampling for the entire Upper Susquehanna Subbasin.

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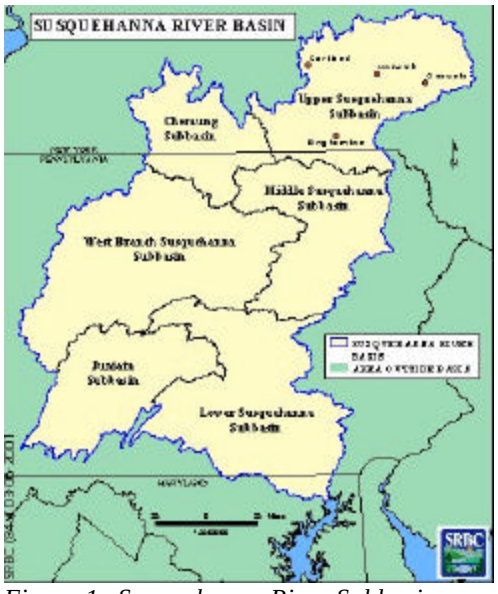

Figure 1. Susquehanna River Subbasins

Methods Used in the Subbasin Survey

Field and Laboratory Methods

Site placement and sampling frequency

Field and laboratory data (see Appendix) for year-two Upper Susquehanna Subbasin sampling were collected during periods of high precipitation, as well as periods of little or no precipitation when stream flows were maintained primarily by baseflow. Twenty sites were sampled bimonthly, starting in October 1999, and ending in August 2000 (Figure 2).

These sampling sites (Table 1) were selected after consultation with the New York State Department of Environmental Conservation (NYSDEC), the Upper Susquehanna Coalition, and the State University of New York at Binghamton (SUNY-Binghamton). The sites were chosen to help clarify the effects of major tributaries and major urban areas on streams, as well as facilitate watershed management planning and remediation activities.

Macroinvertebrate samples were collected from seventeen of the twenty sites using a slightly modified version of the U.S. Environmental Protection Agency's Rapid Bioassessment Protocols (RBP). RBP III, the most detailed of the three protocols, was used in this study, and is capable of showing levels of stream impairment. Using the RBP III method allows for comparison of habitat and biological scores of sample sites to a reference site. The reference site represents an area of minimal disturbance within an ecological region. The remaining three sites on the main stem of the Susquehanna and Chenango Rivers were sampled for water quality purposes only and were not included in the RBP III study. Water quality samples were collected at each river site using a depth integrated sampler.

Field Analysis

Physical and chemical parameters measured for field and laboratory analysis are listed in Table 2. The following equipment was used for field analysis: a Cole-Parmer Model 1481 meter was used to determine conductivity; a Cole-Parmer Model 5996 meter was used to determine pH; and a YSI Model 55 dissolved oxygen meter was used to determine dissolved oxygen. Alkalinity was determined by titration of a known volume of sample water to pH 4.5, with 0.02 N H_2SO_4. Acidity was determined by titration of a known volume of sample water to pH 8.3, with 0.02 N NaOH.

Table 2. Water Quality Parameters Sampled in the Upper Susquehanna Subbasin Small Watershed Study

Field Parameters
Temperature, °C
Flow, instantaneous cfs
pH
Conductivity, umhos/cm
Dissolved Oxygen, mg/l
Acidity, mg/l
Alkalinity, mg/l
Laboratory Analysis
Total Residue, mg/l
Total Suspended Solids, mg/l
Nitrogen, Total, mg/l
Ammonia, Total, mg/l
Nitrite-N, Total, mg/l
Nitrate-N, Total, mg/l
Phosphorous, Total, mg/l
Organic Carbon, Total, mg/l
Orthophosphate, Total, mg/l

Laboratory Analysis

Water samples for laboratory analysis were collected at each site to measure nutrient concentrations. Two 250-ml bottles of water were collected for laboratory analyses. One bottle was acidified to pH 2, or less, with sulfuric acid for nutrient analysis. Samples were iced and shipped to the Pennsylvania Department of Environmental Protection, Bureau of Laboratories in Harrisburg, Pa.

Water quality was assessed with a simple Water Quality Index (WQI), using procedures established by McMorran and Bollinger (1990). Comparisons were made among sampling periods at each station using this WQI. Eleven parameters were considered, eight of which were nutrients. Each parameter from every site was ranked from 0 to 100 to obtain a percentile score. Based on analysis of parameters, each site then was designated "excellent," "good," "fair," or "poor."

Macroinvertebrate and physical habitat sampling

Benthic macroinvertebrates were collected from each sample site, except those on the main stem of the Susquehanna and the Chenango Rivers. These river sites were nonwadeable, with no riffles available for sampling. The benthic macroinvertebrate community of each stream site was sampled to provide an indication of the biological condition of the stream.

Benthic macroinvertebrate samples were analyzed using procedures described in Rapid Bioassessment Protocol for Use in Streams and Rivers by Plafkin and others (1989).

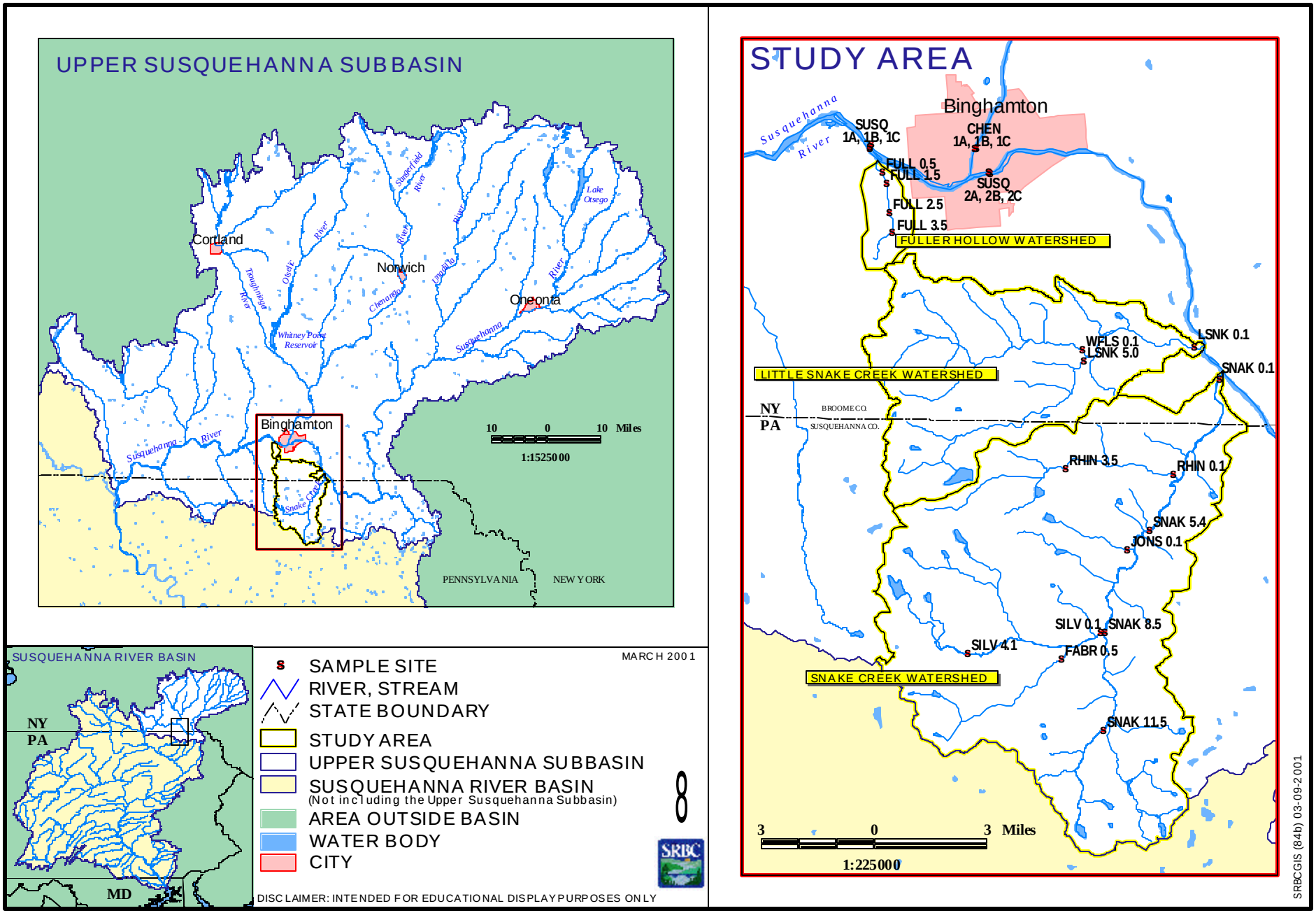

Figure 2. Upper Susquehanna Subbasin Survey Small Watershed Study Site Locations

Table 1. Upper Susquehanna Subbasin Survey Small Watershed Study Site Locations

Sample Site No.	Site Name	Site Location Description	Latitude	Longitude
1	FABR 0.5	Fall Brook at Salt Spring State Park near Franklin Forks, Pa.	415426	755206
2	SNAK 11.5	Snake Creek 3 miles north of Lake Montrose near Montrose, Pa.	415249	755047
3	SNAK 8.5	Snake Creek at Forks Hill Road bridge, Franklin Forks, Pa.	415504	755046
4	SNAK 5.4	Snake Creek at Shadow Brook Road bridge, near Stanfordville, Pa.	415725	754925
5	SNAK 0.1	Snake Creek at N.Y. Route 7a bridge, Corbettsville, N.Y.	420055	754719
6	SILV 4.1	Silver Creek at Pa Route 167 bridge near Fisk Mill, Pa.	415433	755460
7	SILV 0.1	Silver Creek at Pa Route 29 bridge, Franklin Forks, Pa.	415504	755053
8	JONS 0.1	Jones Creek at Route Pa 29 bridge near Stanfordville, Pa.	415658	755005
9	RHIN 3.5	Rhiney Creek at dirt road bridge near Brookdale, Pa.	415849	755202
10	RHIN 0.1	Rhiney Creek at Pa Route 29 bridge, Brookdale, Pa.	415843	754841
11	LSNK 5.0	Little Snake Creek at Gregory Road bridge, Conklin Forks, N.Y.	420119	755129
12	LSNK 0.1	Little Snake Creek at Erie-Lackawanna RR bridge, Conklin, N.Y.	420139	754806
13	WFLS 0.1	West Fork Little Snake Creek upstream of confluence with Little Snake Creek, Conklin Forks, N.Y.	420135	755133
14	FULL 3.5	Fuller Hollow Creek in the park at Fuller Hollow Road, Binghamton, N.Y.	420414	755728
15	FULL 2.5	Fuller Hollow Creek at the foot bridge in the park area south of the SUNY- Binghamton campus, Binghamton, N.Y.	420440	755732
16	FULL 1.5	Fuller Hollow Creek at the foot bridge to SUNY-Binghamton campus parking lot, Binghamton, N.Y.	420521	755738
17	FULL 0.5	Fuller Hollow Creek near rugby fields on SUNY-Binghamton campus, Binghamton, N.Y.	420537	755747
18a	SUSQ 1A	Susquehanna River at the N.Y. Route 201 bridge-left bank, Binghamton, N.Y.	420610	755812
18b	SUSQ 1B	Susquehanna River at the N.Y. Route 201 bridge-center, Binghamton, N.Y.	420612	755811
18c	SUSQ 1C	Susquehanna River at the N.Y. Route 201 bridge-right bank, Binghamton, N.Y.	420615	755809
19a	SUSQ 2A	Susquehanna River at the Exchange Street bridge-left bank, Binghamton, N.Y.	420536	755428
19b	SUSQ 2B	Susquehanna River at the Exchange Street bridge-center, Binghamton, N.Y.	420538	755429
19c	SUSQ 2C	Susquehanna River at the Exchange Street bridge-right bank, Binghamton, N.Y.	420539	755430
20a	CHEN 1A	Chenango River at the Memorial Bridge-left bank, Binghamton, N.Y.	420610	755453
20b	CHEN 1B	Chenango River at the Memorial Bridge-center, Binghamton, N.Y.	420610	755454
20c	CHEN 1C	Chenango River at the Memorial Bridge-right bank, Binghamton, N.Y.	420611	755456

Sampling was performed using a 1-meter-square kick screen with size No. 30 mesh. The kick screen was stretched across the current to collect organisms dislodged from riffle/run areas by physical agitation of the stream substrate. Two kick screen samples were collected from a representative riffle/run at each station. The two samples were composited and preserved in isopropyl alcohol for later laboratory analysis.

In the laboratory, composite samples were sorted into 100-organism subsamples using a gridded pan and a random numbers table. The organisms contained in the subsamples were identified to genus (except Chironomidae) and enumerated. Six statistical measurements, or metrics (Table 3), then were used to analyze the macroinvertebrate data and determine the biological condition of each site. This was accomplished by expressing each of the metrics as a percentage of the reference score. These scores were summed to produce a total score for each site. Then, the total score was expressed as a percentage of the reference score to provide a biological condition category, designated as "nonimpaired," "slightly impaired," "moderately impaired," or "severely impaired."

Habitat conditions were evaluated using a modified version of RBP III (Plafkin, 1989). Parameters relating to substrate and instream cover were rated on a scale from 0 to 20, with 20 being optimal. These included bottom substrate, embeddedness, and velocity/depth diversity. Parameters relating to channel morphology were rated on a scale from 0 to 15, and included pool/riffle or run/bend ratio, pool quality, riffle/run quality, and channel alteration. Bank erosion, bank stability, streamside cover, and riparian zone were rated on a scale from 0 to 10. Land uses, types of bottom substrate, and other important stream characteristics also were noted.

Habitat scores were summed to produce a total habitat score for each site. These scores then were compared to the total score of the reference site to determine the degree to which the site's habitat could support aquatic life. Sites were characterized as "excellent," "supporting," "partially supporting," or "nonsupporting."

Table 3. Metrics Used to Analyze Macroinvertebrate Data in the Upper Susquehanna Subbasin Small Watershed Study

Taxonomic Richness - The total number of taxa in the sample.

Shannon Diversity Index - A measure of the diversity of the community. A macro invertebrate community in a stream with good water quality and habitat will have a diverse number of taxa with no one taxa dominating over the others, while poor water quality and habitat produce stressful conditions that allow one or more taxa to dominate.

Hilsenhoff Biotic Index - A measure of organic pollution tolerance. The lower the number, the less tolerant the macroinvertebrate community is to pollution.

EPT Index - Mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Tricoptera) are collectively referred to as EPT. These aquatic insects are very sensitive to water pollution, and are often used as indicators of good water quality. Thus, the EPT Index is another measure of pollution tolerance. A high EPT Index indicates that the stream supports a healthy biological community due to a good water quality.

Percent Taxonomic Similarity - A measure of the similarity between the kinds of organisms in the sample and those found at the reference site.

Percent Trophic Similarity - Feeding habits of aquatic insects (shredding, filtering-collecting, scraping, predation, and collecting-gathering) reflect the food resources available to them. Available food resources, in turn, mirror the way energy, in the form of organic matter, is distributed throughout an aquatic ecosystem. A trophically-balanced community has a good spread of all feeding types. All sites are measured against a healthy reference site and assigned scores that reflect their trophic balance in relation to that reference site.

Results

The seventeen sample sites included in the RBP III sampling method fall within three subwatersheds: Snake Creek; Little Snake Creek; and Fuller Hollow Creek (Figure 1). The reference site for this study was on Fall Brook in the Snake Creek subwatershed.

Snake Creek Subwatershed

Ten sites were sampled in this subwatershed, four of which were on the main stem of Snake Creek. The remaining six sites were on tributaries (Silver Creek, Fall Brook, Jones Creek, and Rhiney Creek) to Snake Creek. Water quality at all sites in this subwatershed was good to excellent for each sampling period.

Habitat scores for SNAK 5.4, SNAK 8.5, and SNAK 11.5 were excellent, while SNAK 0.5 was rated as supporting. The remaining tributary sites (RHIN 0.1, RHIN 4.5, JONS 0.1, and SILV 4.1) had a habitat rating of excellent, except for SILV 0.1, which had a rating of partially supporting. Channel alteration, lack of riparian zone, and poor pool quality were the main causes of lower habitat scores at SNAK 0.5 and SILV 0.1.

Biological scores indicated RHIN 0.1, RHIN 3.5, JONS 0.1, SILV 4.1, SNAK 8.5, and SNAK 11.5 were slightly impaired. It should be noted, however, that of those six sites, only JONS 0.1 showed signs of actual impairment due to a low Ephemeroptera/Plecoptera/Tricoptera (EPT) Index score.

The reference site, FABR 0.5, had an extremely low Hilsenhoff Biotic Index score (HBI) (0.789) due to large numbers of *Leuctra* (Plecoptera: Leuctridae) (Hilsenhoff of 0) and *Dolophilodes* (Trichoptera: Philopotamidae) (Hilsenhoff of 0) found at this site. Therefore, although the other five sites had macroinvertebrate communities with a low HBI, they were not as low as the HBI for the reference site community, and received a slightly impaired score. JONS 0.1, although it had a HBI comparable to the reference site, rated poorly in areas of taxonomic richness, percent taxonomic similarity, and percent trophic similarity. SILV 0.1 and SNAK 5.0 were nonimpaired, and SNAK 0.5 had moderate impairment due to a low EPT Index score.

Little Snake Creek Subwatershed

Three sites were sampled in the Little Snake Creek subwatershed: two on the main stem of Little Snake Creek, and one on West Fork Little Snake Creek. Water quality at all three sites was assessed as good to excellent during all sampling periods, except for LSNK 0.1, which had a rating of "fair" during the April sampling event. Total orthophosphate was significantly elevated at this site during this time, possibly due to increased agricultural activity.

WSLC 0.1 and LSNK 5.0 had habitat ratings of supporting, while LSNK 0.1 had a rating of partially supporting due to lack of bank stability, and extensive channel alteration and bank erosion from heavy dredging activities within the channel. All three sites had poor riparian zones.

Biological scores for WLSC 0.1 and LSNK 0.1 showed moderate impairment; however, this biological score may not reflect the actual state of biological conditions for LSNK 0.1. Although total number of common taxa and taxonomic richness were low in both samples, it should be noted that the majority of the LSNK 0.1 sample was comprised of cast skins (the shed exoskeletons of macroinvertebrates).

Normally, a macroinvertebrate sample is comprised of a count of 100 organisms. In the case of LSNK 0.1 though, a large percentage of the sample was cast skins, not actual macroinvertebrates (it should be noted that the previously mentioned heavy dredging at this site may have affected the organism count). Because cast skins cannot, in most cases, be accurately identified to genus, they were not counted. Therefore, the total number of common taxa and taxonomic richness for this sample skewed lower than it might have been otherwise.

The taxonomic richness score for LSNK 0.1 and WLSC 0.1 was low, but again, the score for LSNK 0.1 was probably lower due to the presence of the cast skins. LSNK 5.0 showed a biological score of slightly impaired; however, the HBI for this site was low. As with the sites in Snake Creek, when the HBI of this site was compared to the extremely low HBI of the reference site, it scored as slightly impaired. All other

biological condition scores for LSNK 5.0 were high, except for tropic similarity.

Fuller Hollow Creek Subwatershed

Four sites were sampled on the main stem in the Fuller Hollow Creek subwatershed. Water quality rated as good to fair at all four sites. FULL 3.5 received a score of excellent during the October and December sampling events.

FULL 0.5, FULL 1.5, and FULL 2.5 had a habitat rating of supporting due to a lack of riparian zone at all three sites, a lack of vegetative cover at FULL 0.5, extensive channel alteration, bank erosion, and bank instability at FULL 1.5, and bank erosion at FULL 2.5. FULL 3.5 had a score of excellent, and had the best riparian zone and stream banks of all four sites.

Biological scores showed a rating of moderate impairment for all four sites. "Number of common taxa" metrics were low at all sites, and most of the index scores were low, especially EPT Index scores. Except for the headwater region, all of Fuller Hollow Creek runs through a residential area.

The riparian zone along the lower three quarters of the creek is minimal, and, in some cases, backyards extend to the creek bank. One half-mile before Fuller Hollow Creek empties into the Susquehanna River, a discharge pipe releases unknown effluent into the creek. This discharge raises the conductivity of the creek substantially below the pipe. This sample site consistently has one of the highest conductivity readings of all the sample sites, including the river sites.

Susquehanna and Chenango River Sites

Three sample sites were located on the main stems of the Susquehanna and Chenango Rivers. The site on the Chenango River is approximately one mile upstream of its confluence with the Susquehanna River. The two sites on the Susquehanna River bracket the Chenango River confluence. Due to the width of the rivers, three subsamples were collected at each site: one near the left bank; one in the middle of the river; and one near the right bank.

Water quality at the Chenango River site ranged from good to fair. The two Susquehanna River sites also ranged in score from good to fair, with one area of concern. The left bank subsample of the downstream Susquehanna River site consistently had an ammonia reading notably higher than all other river site subsamples in this study. It also had some of the highest readings for nitrites and nitrogen.

Immediately upstream of the subsample site is the Binghamton-Johnson City Joint Sewerage Treatment Plant (STP). The discharge from this STP is a possible explanation for the higher ammonia, nitrite, and nitrogen levels and poor water quality score for this subsample. Any STP in Broome County, N.Y., releasing municipal effluent into the Susquehanna River is in compliance with the NYSDEC, if it discharges no more than 20 mg/l (interim limit) of ammonia.

The ammonia levels recorded at the downstream Susquehanna River left bank subsample site for all six sampling events, did not exceed the 20 mg/l NYSDEC regulation. According to the NYSDEC Syracuse office, the Binghamton-Johnson City Joint STP is in compliance with state regulations, even though the subbasin water quality score assigned to the downstream subsample is fair to poor. Currently, there are no NYSDEC regulations for nitrites or nitrogen effluent releases from STPs.

Conclusions

All twenty sites in the year-two Upper Susquehanna Subbasin Small Watershed Study had good water quality, except for the left bank subsample of the downstream Susquehanna River site. As discussed, this may be due to the Binghamton-Johnson City Joint STP upstream of the site.

According to the current study, Snake Creek was the subwatershed with the highest potential for watershed protection efforts. In general, it had biological communities, habitat, and water quality that all scored as nonimpaired. Snake Creek also was listed as one of the watersheds with the highest potential for watershed protection efforts in the year-one report of the Upper Susquehanna Subbasin Survey. Protecting this nonimpaired watershed should be a priority of environmental agencies and local watershed associations.

Areas for concern include Little Snake Creek and Fuller Hollow Creek subwatersheds. Little Snake Creek had macroinvertebrate communities that scored as moderately and slightly impaired, while water quality scores were good to excellent. One possible explanation for the impaired macroinvertebrate communities relates to habitat conditions. At LSNK 0.1, the stream showed signs of heavy equipment dredging. Major streambed disruption of this kind degrades the habitat for macroinvertebrate communities and other aquatic life. Reestablishing the riparian vegetation along areas of this stream also may increase the macroinvertebrate and habitat scores for this subwatershed.

Fuller Hollow Creek also is an area of concern. All four sample sites had moderately impaired biological communities, and three had supporting habitat scores. FULL 3.5 had habitat and water quality scores of excellent, but it also had the best riparian zone of the four sites. Reestablishing the riparian vegetation, where possible along the creek's length, would help raise the habitat, water quality, and possibly the macroinvertebrate scores for Fuller Hollow Creek. Additional sampling may be needed to support and document remediation efforts.

SRBC will provide the data and information contained in this report to local groups and agencies that are working in these watersheds. This information can be used to enhance grant applications that support watershed protection, restoration, and enhancement.

APPENDIX

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR 0.5	19991025	1340	3.989	7.9	7.30	6.46	82	24	6
SNAK 11.5	19991025	1150	7.599	8.3	7.20	6.68	113	24	6
SNAK 8.5	19991025	1230	12.271	8.8	7.45	6.69	99	22	4
SNAK5.4	19991025	1530	26.430	10.1	7.25	6.52	97	24	6
SNAK0.1	19991026	1445	31.641	9.4	7.40	6.13	100	22	4
SILV4.1	19991025	1415	1.883	8.0	7.30	6.55	86	20	6
SILV 0.1	19991025	1300	15.601	8.1	7.30	6.90	89	20	4
JONS0.1	19991025	1445	NA	8.4	7.10	6.26	54	12	4
RHIN3.5	19991025	1610	2.823	9.0	7.30	6.51	84	26	4
RHIN0.1	19991026	1530	2.621	8.5	7.00	6.09	91	22	4
LSNAK5.0	19991027	900	7.169	6.6	7.10	6.31	128	18	2
LSNAK0.1	19991027	1100	11.289	7.1	7.20	6.30	139	18	2
WFLS0.1	19991027	1000	2.809	6.4	7.30	6.89	161	26	4
FULL3.5	19991027	1315	NA	6.7	6.95	5.92	137	36	2
FULL2.5	19991027	1200	NA	8.0	7.85	6.68	283	106	4
FULL1.5	19991027	1130	NA	8.1	8.30	7.10	321	114	0
FULL0.5	19991026	1630	NA	13.5	8.20	5.72	1,397	154	2
SUSQ1A	19991027	1400	NA	9.6	7.65	6.43	265	74	4
SUSQ1B	19991027	1430	NA	8.6	7.50	6.33	187	54	4
SUSQ1C	19991027	1500	NA	8.5	8.00	6.24	251	80	2
SUSQ2A	19991026	0800	NA	7.5	7.80	6.19	180	58	4
SUSQ2B	19991026	0830	NA	7.4	7.80	6.22	178	56	4
SUSQ2C	19991026	0915	NA	7.4	7.70	6.20	179	58	4
CHEN1A	19991026	1115	NA	8.1	7.90	6.47	305	102	2
CHEN1B	19991026	1045	NA	8.3	8.00	6.50	303	102	2
CHEN1C	19991026	1015	NA	8.2	8.00	6.53	304	100	2

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR 0.5	19991206	1515	16.208	7.7	6.75	6.37	72	16	6
SNAK11.5	19991206	1445	9.998	7.8	6.90	6.49	106	22	4
SNAK8.5	19991206	1330	25.950	8.2	7.10	6.55	89	20	4
SNAK5.4	19991206	1645	72.303	7.8	6.85	6.57	84	16	6
SNAK0.1	19991207	0830	69.998	5.7	7.25	6.27	85	18	2
SILV4.1	19991206	1545	9.207	7.7	6.75	6.53	76	14	6
SILV0.1	19991206	1400	38.759	7.5	6.80	6.59	78	14	4
JONS0.1	19991206	1615	NA	7.1	6.35	6.47	22	12	8
RHIN3.5	19991206	1715	8.722	7.2	6.80	6.46	60	24	4
RHIN0.1	19991207	0930	10.927	5.2	7.10	6.15	81	18	4
LSNK5.0	19991207	1100	12.204	5.3	6.82	6.17	105	14	4
LSNAK0.1	19991207	0800	25.236	5.2	7.23	6.73	35	20	2
WFLS0.1	19991207	1030	14.441	5.1	6.68	6.14	124	16	4
FULL3.5	19991208	1100	NA	2.9	7.15	6.49	120	26	6
FULL2.5	19991208	1030	NA	3.3	7.20	6.97	210	58	4
FULL1.5	19991208	1130	NA	3.4	7.60	6.59	196	60	4
FULL0.5	19991208	0945	NA	3.2	8.00	6.77	307	66	2
SUSQ1A	19991207	1400	NA	4.9	7.30	6.60	183	50	4
SUSQ1B	19991207	1415	NA	4.4	7.25	6.75	154	48	4
SUSQ1C	19991207	1430	NA	4.4	7.25	6.61	196	58	4
SUSQ2A	19991207	1145	NA	5.0	7.05	6.54	137	38	4
SUSQ2B	19991207	1200	NA	5.0	7.10	6.59	136	40	4
SUSQ2C	19991207	1215	NA	5.0	7.10	6.55	149	38	4
CHEN1A	19991208	0915	NA	4.5	7.70	5.91	202	56	2
CHEN1B	19991208	0845	NA	4.3	7.65	6.31	198	54	2
CHEN1C	19991208	0815	NA	4.1	7.70	6.33	196	56	2

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—*Continued*

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR0.5	20000221	1500	19.771	0.7	6.90	7.05	77	20	6
SNAK11.5	20000221	1130	11.181	0.6	6.95	6.90	119	16	4
SNAK8.5	20000221	1225	28.884	0.7	6.95	7.11	99	16	4
SNAK5.4	20000221	1610	74.886	1.2	6.85	6.92	92	20	6
SNAK0.1	20000221	1015	88.211	0.7	6.90	7.10	91	14	4
SILV4.1	20000221	1405	10.399	0.7	6.65	6.99	84	16	6
SILV0.1	20000221	1310	45.171	0.6	6.70	7.26	84	14	4
JONS0.1	20000221	1655	NA	1.3	6.30	6.79	41	16	6
RHIN3.5	20000222	0930	9.591	0.8	6.70	6.62	62	30	4
RHIN0.1	20000222	0805	11.368	0.7	6.90	7.02	77	16	4
LSNAK5.0	20000222	1110	13.343	1.1	6.90	7.19	107	20	6
LSNAK0.1	20000221	0925	32.664	0.5	7.05	7.61	130	16	2
WFLS0.1	20000222	1215	15.383	0.9	6.85	7.14	139	20	4
FULL3.5	20000223	0945	NA	2.3	7.00	6.50	121	20	4
FULL2.5	20000223	0850	NA	2.3	7.35	7.04	219	40	4
FULL1.5	20000223	0810	NA	2.1	7.40	6.88	341	44	4
FULL0.5	20000223	1030	NA	3.7	7.50	6.35	404	50	4
SUSQ1A	20000223	1130	NA	1.3	7.15	6.46	242	58	6
SUSQ2A	20000222	1530	NA	0.8	7.15	6.95	156	40	6
SUSQ2B	20000222	1600	NA	0.8	7.10	6.70	158	38	6
CHEN1A	20000222	1445	NA	0.7	7.50	6.50	254	72	4
CHEN1B	20000222	1415	NA	0.6	7.65	6.53	255	78	4
CHEN1C	20000222	1345	NA	0.2	7.40	6.47	229	68	2

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—*Continued*

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR0.5	20000419	0945	NA	6.3	6.40	5.59	54	10	4
SNAK11.5	20000418	1055	NA	7.9	6.80	5.81	92	14	4
SNAK8.5	20000418	1130	NA	6.5	6.30	5.26	72	10	4
SNAK5.4	20000419	1130	NA	7.2	6.40	5.18	63	10	4
SNAK0.1	20000418	1020	NA	6.7	6.60	5.62	68	13	4
SILV4.1	20000419	1030	NA	6.7	6.40	5.48	56	8	4
SILV0.1	20000419	0900	NA	6.5	6.65	5.94	56	10	6
JONS0.1	20000419	1100	NA	7.1	6.30	4.67	38	8	4
RHIN3.5	20000419	1300	NA	7.7	6.30	5.00	45	8	4
RHIN0.1	20000419	1200	NA	7.2	6.60	5.65	52	10	4
LSNAK5.0	20000419	1345	NA	7.2	6.40	5.42	72	10	6
LSNAK0.1	20000418	1005	NA	6.5	7.00	6.01	87	16	6
WFLS0.1	20000419	1415	NA	7.2	6.50	5.17	77	14	4
FULL 3.5	20000417	1030	NA	8.1	6.85	5.53	93	26	4
FULL2.5	20000417	1110	NA	7.9	7.40	5.68	150	42	4
FULL1.5	20000417	1310	NA	9.0	7.50	5.52	280	52	2
FULL0.5	20000417	1345	NA	9.0	7.55	5.58	261	54	2
SUSQ1A	20000418	1215	NA	8.3	7.00	5.38	173	44	4
SUSQ1B	20000418	1230	NA	8.2	7.15	5.27	141	46	4
SUSQ1C	20000418	1245	NA	8.1	7.45	5.31	184	54	4
SUSQ2A	20000418	0940	NA	7.8	7.35	5.22	137	44	4
SUSQ2B	20000418	0915	NA	8.3	7.30	5.31	140	44	4
SUSQ2C	20000418	0845	NA	8.7	7.20	5.39	144	42	4
CHEN1A	20000417	1600	NA	10.0	7.55	5.35	211	68	4
CHEN1B	20000417	1515	NA	10.1	7.65	5.38	216	64	4
CHEN1C	20000417	1430	NA	10.2	7.50	5.33	228	64	4

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR0.5	20000605	1330	9.735	12.4	6.90	6.28	73	20	2
SNAK11.5	20000605	1125	7.900	13.0	7.00	5.81	113	30	4
SNAK8.5	20000605	1245	12.627	13.2	7.00	6.41	98	26	4
SNAK5.4	20000606	0930	NA	11.7	6.75	6.44	86	22	2
SNAK0.1	20000606	0830	94.887	12.2	6.90	6.37	86	22	4
SILV4.1	20000605	1430	4.241	12.6	6.80	6.06	78	14	6
SILV0.1	20000605	1215	18.060	12.7	6.90	6.15	78	20	2
JONS0.1	20000605	1530	NA	11.8	6.50	6.25	47	10	2
RHIN3.5	20000606	1200	17.170	11.7	6.60	6.10	69	18	4
RHIN0.1	20000606	1045	26.242	12.0	6.95	6.26	80	22	2
LSNK5.0	20000606	1400	21.299	12.1	6.95	6.37	106	22	4
LSNK0.1	20000606	1500	50.368	12.7	7.05	6.34	113	24	4
WFLS0.1	20000606	1300	26.475	12.1	7.05	6.37	130	24	4
FULL3.5	20000607	1145	NA	12.4	7.40	5.63	120	46	2
FULL2.5	20000607	1115	NA	11.8	7.65	5.98	184	60	2
FULL1.5	20000607	1215	NA	15.3	8.25	5.88	220	70	2
FULL0.5	20000607	1100	NA	13.2	8.30	6.12	279	74	0
SUSQ1A	20000607	1245	NA	15.8	7.65	5.66	191	56	2
SUSQ1B	20000607	1300	NA	16.4	7.70	5.36	184	58	2
SUSQ1C	20000607	1315	NA	15.9	8.00	5.58	258	82	2
SUSQ2A	20000607	0930	NA	13.8	7.40	5.26	175	64	4
SUSQ2B	20000607	1000	NA	13.7	7.50	5.40	175	56	4
SUSQ2C	20000607	1035	NA	13.8	7.40	5.53	179	58	4
CHEN1A	20000607	0900	NA	12.5	7.70	NA	279	90	2
CHEN1B	20000607	0815	NA	12.4	7.60	NA	280	92	2
CHEN1C	20000607	0730	NA	12.7	7.70	NA	282	98	2

Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—*Continued*

Station	Date (yyyymmdd)	Time (hhmm)	Flow (cfs)	Water Temperature (degree Centigrade)	pH	Dissolved Oxygen (mg/l)	Conductance (µmhos/cm)	Alkalinity (mg/l)	Acidity (mg/l)
FABR0.5	20000828	1315	0.656	17.4	7.70	5.50	114	42	2
SNAK11.5	20000828	1120	1.352	17.3	7.40	5.34	151	46	4
SNAK8.5	20000828	1200	1.258	19.1	8.10	5.48	139	42	2
SNAK5.4	20000829	0945	3.465	18.7	7.40	4.80	128	32	2
SNAK0.1	20000829	0830	3.792	18.7	7.40	5.40	122	34	2
SILV4.1	20000828	1415	0.393	19.1	7.55	5.26	104	54	2
SILV0.1	20000828	1230	1.932	18.6	7.60	5.97	130	34	2
JONS0.1	20000828	1500	NA	17.7	7.20	4.89	71	22	4
RHIN3.5	20000829	1130	0.422	21.7	7.95	5.39	159	52	2
RHIN0.1	20000829	1045	0.221	18.5	7.75	5.61	129	42	2
LSNK5.0	20000829	1225	0.218	19.7	7.50	5.39	133	34	2
LSNK0.1	20000829	1410	0.720	21.5	7.65	5.11	159	36	2
WFLS0.1	20000829	1315	NA	22.1	8.65	5.96	177	40	0
FULL2.5	20000830	1220	NA	21.6	8.45	6.37	350	130	0
FULL1.5	20000830	1300	NA	21.5	8.70	7.12	464	136	0
SUSQ1A	20000830	1100	NA	23.5	8.10	5.37	308	92	2
SUSQ1B	20000830	1120	NA	24.0	8.45	5.29	207	68	0
SUSQ1C	20000830	1140	NA	24.1	8.50	5.33	222	76	0
SUSQ2A	20000830	0930	NA	22.0	8.30	5.48	202	70	0
SUSQ2B	20000830	0950	NA	22.2	8.20	5.28	203	74	2
SUSQ2C	20000830	1005	NA	22.2	8.20	5.30	204	70	2
CHEN1A	20000830	0900	NA	21.1	8.20	5.15	388	126	2
CHEN1B	20000830	0845	NA	20.7	8.30	5.32	389	124	0
CHEN1C	20000830	0830	NA	21.2	8.20	5.17	383	124	2

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR 0.5	19991025	1340	80	4	0.37	0.01	0.005	0.08	0.01	2.5	0.001
SNAK 11.5	19991025	1150	90	1	0.52	0.01	0.005	0.10	0.03	3.2	0.001
SNAK 8.5	19991025	1230	66	1	0.35	0.01	0.005	0.14	0.02	2.5	0.001
SNAK5.4	19991025	1530	1	1	0.38	0.01	0.005	0.21	0.02	2.4	0.003
SNAK0.1	19991026	1445	100	1	0.42	0.01	NA	0.12	0.01	2.1	0.004
SILV4.1	19991025	1415	50	1	0.35	0.01	0.005	0.06	0.03	3.0	0.001
SILV 0.1	19991025	1300	72	12	0.36	0.01	0.005	0.13	0.02	2.5	0.001
JONS0.1	19991025	1445	24	1	0.24	0.01	0.005	0.02	0.03	1.9	0.001
RHIN3.5	19991025	1610	50	1	0.28	0.01	0.005	0.02	0.03	3.2	0.004
RHIN0.1	19991026	1530	98	1	0.30	0.01	NA	0.02	0.03	2.7	0.001
LSNAK5.0	19991027	0900	122	1	0.26	0.01	NA	0.02	0.02	2.2	0.002
LSNAK0.1	19991027	1100	110	12	0.29	0.01	NA	0.02	0.01	1.8	0.002
WFLS0.1	19991027	1000	132	1	0.26	0.01	NA	0.02	0.02	2.1	0.001
FULL3.5	19991027	1315	134	1	0.25	0.01	NA	0.02	0.01	3.0	0.003
FULL2.5	19991027	1200	250	1	0.22	0.01	NA	0.02	0.04	2.5	0.010
FULL1.5	19991027	1130	264	8	0.34	0.01	NA	0.08	0.03	2.6	0.002
FULL0.5	19991026	1630	948	1	0.64	0.09	NA	0.21	0.03	1.8	0.003
SUSQ1A	19991027	1400	214	28	2.58	1.09	NA	0.18	0.31	4.3	0.083
SUSQ1B	19991027	1430	180	1	0.63	0.01	NA	0.19	0.06	3.0	0.007
SUSQ1C	19991027	1500	240	1	0.66	0.01	NA	0.26	0.04	3.2	0.003
SUSQ2A	19991026	0800	112	1	0.60	0.02	0.005	0.23	0.04	2.7	0.001
SUSQ2B	19991026	0830	88	1	0.58	0.01	0.005	0.25	0.04	2.7	0.001
SUSQ2C	19991026	0915	114	1	0.58	0.02	0.005	0.24	0.04	3.0	0.001
CHEN1A	19991026	1115	1	1	0.70	0.02	0.005	0.31	0.03	3.1	0.005
CHEN1B	19991026	1045	206	1	0.67	0.01	0.005	0.31	0.04	3.2	0.001
CHEN1C	19991026	1015	50	4	0.73	0.01	0.005	0.31	0.04	3.2	0.001

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR 0.5	19991206	1515	66	1	0.67	0.02	NA	0.25	0.07	2.4	0.023
SNAK11.5	19991206	1445	64	1	0.83	0.01	NA	0.35	0.04	3.0	0.022
SNAK8.5	19991206	1330	70	1	0.69	0.04	NA	0.28	0.05	3.0	0.028
SNAK5.4	19991206	1645	34	8	0.66	0.01	NA	0.23	0.05	2.5	0.022
SNAK0.1	19991207	830	56	1	0.69	0.01	NA	0.30	0.10	2.4	0.027
SILV4.1	19991206	1545	64	1	0.48	0.01	NA	0.12	0.04	3.2	0.025
SILV0.1	19991206	1400	60	1	0.59	0.01	NA	0.51	0.08	2.5	0.028
JONS0.1	19991206	1615	42	1	0.30	0.01	NA	0.84	0.10	1.8	0.022
RHIN3.5	19991206	1715	52	1	0.35	0.09	NA	0.02	0.05	3.0	0.020
RHIN0.1	19991207	0930	34	6	0.50	0.12	NA	0.18	0.05	2.7	0.025
LSNK5.0	19991207	1100	58	1	0.35	0.08	NA	0.07	0.05	2.1	0.017
LSNAK0.1	19991207	0800	68	10	0.56	0.06	NA	0.07	0.10	2.3	0.037
WFLS0.1	19991207	1030	78	1	0.42	0.13	NA	0.07	0.07	2.5	0.021
FULL3.5	19991208	1100	58	1	0.26	0.07	NA	0.02	0.05	2.3	0.005
FULL2.5	19991208	1030	122	1	0.38	0.01	NA	0.10	0.04	2.4	0.011
FULL1.5	19991208	1130	136	1	0.51	0.06	NA	0.13	0.09	3.7	0.005
FULL0.5	19991208	0945	182	8	0.5	0.07	NA	0.12	0.07	3.4	0.017
SUSQ1A	19991207	1400	118	10	1.71	0.69	NA	0.44	0.18	3.3	0.050
SUSQ1B	19991207	1415	104	1	1.04	0.12	NA	0.52	0.11	3.1	0.032
SUSQ1C	19991207	1430	102	24	1.30	0.10	NA	0.66	0.09	3.5	0.028
SUSQ2A	19991207	1145	74	1	0.86	0.08	NA	0.46	0.09	2.7	0.023
SUSQ2B	19991207	1200	92	1	0.93	0.08	NA	0.46	0.07	2.9	0.023
SUSQ2C	19991207	1215	98	1	0.90	0.09	NA	0.47	0.07	2.9	0.036
CHEN1A	19991208	0915	120	16	1.33	0.01	NA	0.66	0.14	17.2	0.047
CHEN1B	19991208	0845	146	4	1.22	0.01	NA	0.66	0.08	3.3	0.024
CHEN1C	19991208	0815	134	1	1.22	0.01	NA	0.66	0.08	3.3	0.026

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR0.5	20000221	1500	60	1	0.70	0.01	0.005	0.47	0.02	1.7	0.005
SNAK11.5	20000221	1130	88	1	1.07	0.02	0.005	0.71	0.09	2.2	0.025
SNAK8.5	20000221	1225	68	1	0.88	0.01	0.005	0.60	0.03	1.8	0.016
SNAK5.4	20000221	1610	76	1	0.84	0.01	0.005	0.57	0.04	1.7	0.005
SNAK0.1	20000221	1015	78	1	0.89	0.01	0.005	0.62	0.08	1.8	0.037
SILV4.1	20000221	1405	60	1	0.57	0.01	0.005	0.31	0.02	2.2	0.015
SILV0.1	20000221	1310	88	1	0.72	0.01	0.005	0.50	0.03	1.8	0.012
JONS0.1	20000221	1655	40	1	0.22	0.01	0.005	0.11	0.03	1.6	0.005
RHIN3.5	20000222	0930	54	1	0.45	0.01	0.005	0.26	0.04	1.9	0.028
RHIN0.1	20000222	0805	82	1	0.87	0.01	0.005	0.54	0.04	2.1	0.012
LSNAK5.0	20000222	1110	84	4	0.46	0.01	0.005	0.31	0.04	1.7	0.029
LSNAK0.1	20000221	0925	86	1	0.55	0.01	0.005	0.36	0.04	1.8	0.005
WFLS0.1	20000222	1215	116	1	0.52	0.01	0.005	0.32	0.04	1.8	0.034
FULL3.5	20000223	0945	102	1	0.18	0.01	0.005	0.07	0.03	1.8	0.013
FULL2.5	20000223	0850	150	1	0.43	0.01	0.005	0.28	0.04	1.8	0.022
FULL1.5	20000223	0810	224	6	0.57	0.01	0.005	0.35	0.05	2.3	0.034
FULL0.5	20000223	1030	258	1	0.70	0.01	0.005	0.39	0.03	2.3	0.026
SUSQ1A	20000223	1130	210	28	1.55	0.21	0.020	0.58	0.20	2.7	0.048
SUSQ2A	20000222	1530	120	10	1.03	0.03	0.005	0.63	0.05	2.0	0.015
SUSQ2B	20000222	1600	126	1	1.00	0.03	0.005	0.63	0.05	2.1	0.045
CHEN1A	20000222	1445	176	4	1.43	0.02	0.005	0.97	0.06	2.2	0.014
CHEN1B	20000222	1415	196	1	1.42	0.03	0.005	0.96	0.05	2.2	0.018
CHEN1C	20000222	1345	180	1	1.39	0.03	0.005	0.93	0.04	2.3	0.017

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR0.5	20000419	0945	60	4	0.64	0.04	0.005	0.31	0.02	2.4	0.027
SNAK11.5	20000418	1055	290	194	1.34	0.05	0.020	0.32	0.29	4.4	0.080
SNAK8.5	20000418	1130	198	144	1.04	0.02	0.010	0.21	0.16	3.8	0.066
SNAK5.4	20000419	1130	72	12	0.61	0.06	0.005	0.30	0.02	2.4	0.023
SNAK0.1	20000418	1020	100	26	0.59	0.03	0.010	0.21	0.05	2.9	0.051
SILV4.1	20000419	1030	68	24	0.51	0.05	0.005	0.21	0.03	2.6	0.029
SILV0.1	20000419	0900	130	18	0.66	0.02	0.005	0.28	0.05	2.5	0.036
JONS0.1	20000419	1100	48	1	0.27	0.05	0.005	0.07	0.02	1.9	0.025
RHIN3.5	20000419	1300	56	16	0.43	0.05	0.005	0.02	0.02	2.7	0.019
RHIN0.1	20000419	1200	76	12	0.56	0.05	0.005	0.25	0.06	2.6	0.040
LSNAK5.0	20000419	1345	68	20	0.48	0.06	0.005	0.17	0.04	2.5	0.042
LSNAK0.1	20000418	1005	328	128	0.53	0.01	0.005	0.12	0.18	3.1	0.170
WFLS0.1	20000419	1415	82	36	0.45	0.03	0.010	0.15	0.03	2.6	0.016
FULL 3.5	20000417	1030	80	6	0.43	0.11	0.005	0.02	0.03	3.0	0.019
FULL2.5	20000417	1110	232	8	0.58	0.11	0.005	0.15	0.03	3.2	0.022
FULL1.5	20000417	1310	212	8	1.04	0.08	0.010	0.35	0.05	6.4	0.052
FULL0.5	20000417	1345	172	1	0.96	0.07	0.010	0.39	0.04	5.7	0.045
SUSQ1A	20000418	1215	188	40	1.30	0.32	0.020	0.39	0.14	3.3	0.056
SUSQ1B	20000418	1230	144	42	0.93	0.06	0.010	0.49	0.05	2.7	0.036
SUSQ1C	20000418	1245	158	18	1.20	0.06	0.005	0.73	0.03	2.7	0.022
SUSQ2A	20000418	0940	124	38	0.88	0.03	0.005	0.46	0.04	2.7	0.038
SUSQ2B	20000418	0915	132	30	0.88	0.02	0.010	0.46	0.04	2.7	0.027
SUSQ2C	20000418	0845	132	32	0.91	0.02	0.005	0.49	0.04	2.8	0.029
CHEN1A	20000417	1600	164	14	1.52	0.05	0.005	0.98	0.04	3.2	0.014
CHEN1B	20000417	1515	170	1	1.49	0.06	0.005	0.97	0.04	3.1	0.016
CHEN1C	20000417	1430	188	32	1.44	0.05	0.005	0.94	0.04	2.8	0.020

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR0.5	20000605	1330	74	1	0.48	0.01	0.005	0.22	0.02	2.2	0.005
SNAK11.5	20000605	1125	72	1	0.62	0.01	0.005	0.26	0.02	2.9	0.005
SNAK8.5	20000605	1245	66	4	0.32	0.01	0.005	0.08	0.02	2.2	0.018
SNAK5.4	20000606	0930	100	6	0.56	0.01	0.005	0.27	0.03	2.7	0.020
SNAK0.1	20000606	0830	3,114	16	0.03	0.01	0.005	0.02	0.03	2.3	0.034
SILV4.1	20000605	1430	54	6	0.50	0.01	0.005	0.18	0.02	3.3	0.018
SILV0.1	20000605	1215	54	1	0.34	0.01	0.005	0.09	0.02	2.1	0.005
JONS0.1	20000605	1530	56	1	0.31	0.01	0.005	0.13	0.02	1.5	0.013
RHIN3.5	20000606	1200	74	8	0.53	0.01	0.005	0.11	0.05	5.0	0.031
RHIN0.1	20000606	1045	66	10	0.63	0.01	0.005	0.22	0.05	4.0	0.031
LSNK5.0	20000606	1400	72	1	0.37	0.01	0.005	0.09	0.02	2.9	0.010
LSNK0.1	20000606	1500	64	1	0.26	0.01	0.005	0.04	0.02	2.3	0.025
WFLS0.1	20000606	1300	94	1	0.47	0.01	0.005	0.12	0.02	3.5	0.012
FULL3.5	20000607	1145	96	8	0.36	0.01	0.005	0.02	0.04	3.3	0.023
FULL2.5	20000607	1115	130	1	0.50	0.01	0.005	0.21	0.02	3.2	0.010
FULL1.5	20000607	1215	168	1	0.57	0.01	0.005	0.17	0.04	4.3	0.023
FULL0.5	20000607	1100	164	1	0.54	0.01	0.005	0.19	0.03	3.6	0.028
SUSQ1A	20000607	1245	142	20	1.24	0.13	0.010	0.44	0.04	3.4	0.027
SUSQ1B	20000607	1300	122	6	0.91	0.01	0.005	0.47	0.03	3.0	0.021
SUSQ1C	20000607	1315	52	4	1.26	0.01	0.010	0.81	0.02	3.0	0.021
SUSQ2A	20000607	0930	152	54	1.01	0.01	0.005	0.44	0.06	3.7	0.020
SUSQ2B	20000607	1000	114	1	0.82	0.01	0.010	0.44	0.03	2.8	0.018
SUSQ2C	20000607	1035	112	4	0.83	0.01	0.005	0.44	0.03	2.8	0.027
CHEN1A	20000607	0900	180	12	1.44	0.01	0.010	0.91	0.03	3.2	0.016
CHEN1B	20000607	0815	174	8	1.44	0.01	0.010	0.92	0.04	3.2	0.017
CHEN1C	20000607	0730	174	6	1.39	0.01	0.010	0.91	0.03	2.9	0.018

Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued

Station	Date (yyyymmdd)	Time (hhmm)	Total Residue (mg/l)	Total Suspended Solids (mg/l)	Total Nitrogen (mg/l)	Total Ammonia (mg/l)	Total Nitrite (mg/l)	Total Nitrate (mg/l)	Total Phosphorus (mg/l)	Total Organic Carbon (mg/l)	Total Ortho-phosphate (mg/l)
FABR0.5	20000828	1315	64	1	0.41	0.01	0.005	0.12	0.02	2.0	0.011
SNAK11.5	20000828	1120	80	18	0.61	0.01	0.005	0.30	0.03	2.3	0.021
SNAK8.5	20000828	1200	76	10	0.36	0.01	0.005	0.08	0.02	2.0	0.014
SNAK5.4	20000829	0945	54	12	0.56	0.01	0.005	0.26	0.01	1.7	0.005
SNAK0.1	20000829	0830	54	1	0.40	0.01	0.005	0.13	0.02	1.7	0.015
SILV4.1	20000828	1415	64	10	0.48	0.01	0.005	0.16	0.02	2.9	0.028
SILV0.1	20000828	1230	94	12	0.35	0.01	0.005	0.02	0.01	1.6	0.014
JONS0.1	20000828	1500	42	10	0.65	0.01	0.005	0.36	0.02	1.5	0.022
RHIN3.5	20000829	1130	82	1	0.48	0.01	0.005	0.02	0.03	3.2	0.017
RHIN0.1	20000829	1045	64	1	0.38	0.01	0.005	0.08	0.01	1.9	0.005
LSNK5.0	20000829	1225	68	1	0.34	0.01	0.005	0.09	0.01	1.6	0.005
LSNK0.1	20000829	1410	86	6	0.33	0.01	0.005	0.05	0.01	1.5	0.015
WFLS0.1	20000829	1315	98	1	0.29	0.01	0.005	0.02	0.01	1.8	0.005
FULL2.5	20000830	1220	194	4	0.82	0.01	0.005	0.57	0.04	2.1	0.035
FULL1.5	20000830	1300	244	16	0.54	0.01	0.005	0.27	0.02	2.4	0.019
SUSQ1A	20000830	1100	162	8	2.54	1.46	0.090	0.23	0.18	4.2	0.120
SUSQ1B	20000830	1120	116	6	0.81	0.06	0.005	0.23	0.04	3.5	0.029
SUSQ1C	20000830	1140	132	8	0.80	0.01	0.005	0.24	0.03	6.7	0.031
SUSQ2A	20000830	0930	98	20	0.66	0.01	0.005	0.24	0.02	3.0	0.013
SUSQ2B	20000830	0950	110	12	0.71	0.01	0.005	0.24	0.02	3.3	0.014
SUSQ2C	20000830	1005	116	8	0.67	0.01	0.005	0.24	0.02	3.1	0.012
CHEN1A	20000830	0900	236	22	1.14	0.01	0.010	0.57	0.04	3.3	0.020
CHEN1B	20000830	0845	226	8	1.17	0.01	0.010	0.59	0.04	3.1	0.022
CHEN1C	20000830	0830	214	12	1.10	0.01	0.010	0.57	0.03	2.9	0.027

Table A3. Upper Susquehanna Streams Habitat Scores Using Rapid Bioassessment Protocol for Use in Streams and Rivers, 2000

Station	Date (yymmdd)	Time (hhmm)	Predominant Material	Bottom Substrate	Embeddedness	Velocity/Depth Diversity	Pool/Riffle Ratio	Pool Quality
FABR 0.5	20000605	1330	3	16	18	10	11	3
RHIN 0.1	20000605	1045	3	16	16	14	10	7
RHIN 4.5	20000605	1200	3	17	17	15	14	11
JONS 0.1	20000605	1530	3	16	17	10	10	7
SILV 4.1	20000605	1430	3	16	16	10	11	7
SILV 0.1	20000605	1215	3	12	16	8	10	4
SNAK 0.5	20000606	0830	3	11	11	16	10	7
SNAK 5.0	20000606	0930	3	16	16	16	12	11
SNAK 8.5	20000605	1245	3	15	16	14	10	11
SNAK 11.5	20000605	1125	3	15	16	15	12	11
WLSC 0.1	20000606	1300	3	10	15	9	10	7
LSNK 0.1	20000606	1500	3	14	14	10	9	10
LSNK 5.0	20000606	1400	3	16	15	9	9	7
FULL 0.5	20000607	1100	3	10	16	9	9	7
FULL 1.5	20000607	1215	3	14	15	9	10	9
FULL 2.5	20000607	1115	3	14	16	10	10	8
FULL 3.5	20000607	1145	3	17	18	10	11	7

Predominant Material Rating: 1-Bedrook 2-Boulder 3-Cobble 4-Gravel 5-Sand/Silt/Clay
Bottom Substrate through Channel Alteration columns are rated on a scale of 1 to 20

Table A3. Upper Susquehanna Streams Habitat Scores Using Rapid Bioassessment Protocol for Use in Streams and Rivers, 2000— *Continued*

Station	Date (yymmdd)	Time (hhmm)	Riffle/Run Quality	Channel Alteration	Upper/Lower Streambank Erosion	Upper/Lower Streambank Stability	Streamside Vegetative Cover	Forested Riparian Buffer Zone Width
FABR 0.5	20000605	1330	12	12	8	9	8	9
RHIN 0.1	20000605	1045	11	10	6	7	6	3
RHIN 4.5	20000605	1200	11	12	5	6	5	8
JONS 0.1	20000605	1530	12	12	8	8	7	9
SILV 4.1	20000605	1430	11	12	5	8	8	5
SILV 0.1	20000605	1215	10	8	5	6	5	2
SNAK 0.5	20000606	0830	9	8	5	8	5	2
SNAK 5.0	20000606	0930	11	11	5	7	9	5
SNAK 8.5	20000605	1245	10	10	6	6	7	2
SNAK 11.5	20000605	1125	11	11	7	6	5	2
WLSC 0.1	20000606	1300	11	10	5	6	5	2
LSNK 0.1	20000606	1500	11	4	2	3	5	2
LSNK 5.0	20000606	1400	11	9	5	6	6	2
FULL 0.5	20000607	1100	9	11	6	9	3	2
FULL 1.5	20000607	1215	9	5	4	5	6	2
FULL 2.5	20000607	1115	11	7	5	7	7	2
FULL 3.5	20000607	1145	8	11	8	8	8	8

Upper/Lower Stream bank Erosion through Forested Riparian Buffer Zone Width columns are rated on a scale of 1 to 10

Table A4. Upper Susquehanna Visible Land Use Ranking, 2000

Station	Old Field	Deciduous Forest	Coniferous Forest	Wetland	Surface Mining	Landfill	Residential	Commercial/ Industrial	Cropland	Pasture	Orchard/ Vineyard/ Nursery	Other
FABR 0.5		1	2				3					
RHIN 0.1		2					1					
RHIN 4.5		1	3	2								
JONS 0.1		1	2				3					
SILV 4.1		1	2									
SILV 0.1							1	2				
SNAK 0.5		4					3		2	1		
SNAK 5.0		2		3			4		1			
SNAK 8.5							1					Playground (2), Cemetery (3)
SNAK 11.5	1	3					4		2			
WLSC 0.1		2					1					
LSNK 0.1		4					3	1	2			
LSNK 5.0		2					1					
FULL 0.5							2					Playfield (1)
FULL 1.5		2					1					
FULL 2.5		3					1					Playground (2)
FULL 3.5		1					3					Playground (2)
FABR 0.5												

Land Use ratings: 1 – very predominant use 2 – predominant use 3 – somewhat predominant use 4 – not a predominant use

Table A5. Upper Susquehanna Stream Characteristics, 2000

Station	Meander	Braided	Channelized	Straight	Riffle	Run/ Glide	Deep Pool	Shallow Pool	Boulder >6ft	Boulder <6ft
FABR 0.5				P	P	P				P
RHIN 0.1				P	P	P		P		P
RHIN 4.5	P				P	P		P		P
JONS 0.1	P				P	P		P		P
SILV 4.1	P				P	P		P		P
SILV 0.1				P	P	P				
SNAK 0.5				P	P	P		P		
SNAK 5.0	P				P	P	P	P		P
SNAK 8.5				P	P	P	P	P		
SNAK 11.5	P				P	P	P	P		
WLSC 0.1				P	P	P				P
LSNK 0.1			P	P	P	P		P		P
LSNK 5.0			P	P	P	P		P		P
FULL 0.5				P	P	P		P		P
FULL 1.5			P	P	P	P		P		P
FULL 2.5				P	P	P		P		P
FULL 3.5	P				P	P		P		P

P = present

***Table A5. Upper Susquehanna Stream Characteristics, 2000**—Continued*

Station	Cobble	Bedrock	Gravel	Sand	Silt	Clay	Concrete/ Gabion	Root Wad	Undercut Bank
FABR 0.5	P	P		P					
RHIN 0.1	P		P	P				P	
RHIN 4.5	P		P	P		P		P	P
JONS 0.1	P		P	P				P	P
SILV 4.1	P		P	P					
SILV 0.1	P		P	P					
SNAK 0.5	P		P	P					
SNAK 5.0	P		P	P				P	
SNAK 8.5	P		P						
SNAK 11.5	P		P						
WLSC 0.1	P		P	P					
LSNK 0.1	P		P	P				P	
LSNK 5.0	P		P	P				P	
FULL 0.5	P	PP	P	P			P		
FULL 1.5	P		P	P				P	P
FULL 2.5	P	PP	P	P					
FULL 3.5	P		P	P				P	

P = present
PP = highly present

***Table A5. Upper Susquehanna Stream Characteristics, 2000**—Continued*

Station	Overhead Cover	Human Refuse	Emergant Vegetation	Submergant Vegetation	Floating Vegetation	Storm Drain	Effluent Discharge	Beaver Pond	Woody Debris	Comments
FABR 0.5	P								P	
RHIN 0.1		P							P	
RHIN 4.5				P					P	
JONS 0.1	P									
SILV 4.1	P			P		P				Some algae on rocks
SILV 0.1				P						Some rocks are algae covered, but not as bad as Snake 8.5
SNAK 0.5				P					P	Algae covered bottom
SNAK 5.0	P			P					P	
SNAK 8.5	P			P						Algae covered rocks, very slippery
SNAK 11.5	P					P			P	
WLSC 0.1		P		P					P	Algae covered rocks
LSNK 0.1		P		P					P	Algae covered rocks
LSNK 5.0				P					P	Channelization—some dredging
FULL 0.5		P		P			P			Algae covered bottom. Pipe outflow with high conductivity
FULL 1.5	P	P		P		P			P	Algae covered bottom
FULL 2.5	P			P						Algae covered rocks
FULL 3.5	P								P	

P = present

Table A6. Upper Susquehanna Macroinvertebrate Data, 2000

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	FALLBK 0.5 6/5/00	RHIN 0.1 6/5/00	RHIN 4.5 6/5/00	JONS 0.1 6/5/00	SILV 4.1 6/5/00	SILV 0.1 6/5/00	SNAK 0.5 6/6/00	SNAK 5.0 6/6/00	SNAK 8.5 6/5/00
Insecta: Coleoptera	Elmidae	*Elmidae*	5										
		Optioservus	4	SC	1			6		1		2	2
		Stenelmis	5	SC		1	30	2		4	2		3
	Psephenidae	*Psephenidae*	4										
		Psephenus	4	SC	2	5	18		5	2	1		2
Diptera	Chironomidae	*Chironomidae*	7	CG	1	24	17	1	26	9	37	5	9
	Simuliidae	*Simuliidae*	6	FC			1				2		1
	Tabanidae	*Tabanidae*	6										
		Tabanus	5	P	1		1			5			
	Tipulidae	*Tipulidae*	4										
		Antocha	3	CG						1		1	
		Dicranota	3	P			1			1			
		Hexatoma	2	P	5	3			7	2		2	5
		Tipula	4	SH		1							
Ephemeroptera	Ameletidae	*Ameletidae*	0										
		Ameletus	0	CG				1					
	Baetidae	*Baetidae*	6										
		Acentrella	4	CG	1				1		4		2
		Baetis	6	CG	1	19	12		26	14	3	10	11
		Centroptilum	2	CG	1			6	1				
	Ephemerellidae	*Ephemerellidae*	2										
		Drunella	1	SC	8	2	1	3	7	6		19	10
		Ephemerella	1	SC	8				2	16		6	6
		Serratella	2	SC					1			1	
	Ephemeridae	*Ephemeridae*	4										
		Ephemera	2	CG			5		1				

Pollution Tolerance Value rated from 0 to 10, with 0 being the least tolerant and 10 being the most tolerant

***Table A6. Upper Susquehanna Macroinvertebrate Data, 2000**—Continued*

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	FALLBK 0.5 6/5/00	RHIN 0.1 6/5/00	RHIN 4.5 6/5/00	JONS 0.1 6/5/00	SILV 4.1 6/5/00	SILV 0.1 6/5/00	SNAK 0.5 6/6/00	SNAK 5.0 6/6/00	SNAK 8.5 6/5/00
Ephemeroptera	Heptageniidae	*Heptageniidae*	3										
		Epeorus	0	CG	8	1	1	51	8			4	
		Heptagenia	4	SC	1	2	7		2		14	3	2
		Stenacron	4	SC							1		
	Isonychiidae	*Isonychiidae*	2										
		Isonychia	2	FC	3	1	3		1	3	3	2	
	Leptophlebiidae	*Leptophlebiidae*	4										
		Leptophlebia	4	CG							11	2	11
		Paraleptophlebia	1	CG						3			
Megaloptera	Corydalidae	*Corydalidae*	3										
		Nigronia	2	P	1	2	2	1	4		1	1	1
	Sialidae	*Sialidae*	4										
		Sialis	4	P			1						
Odonata	Aeshnidae	*Aeshnidae*	3										
		Boyeria	2	P			1		1				
	Gomphidae	*Gomphidae*	4										
		Stylogomphus albistylus	4	P			2			1		1	
Plecoptera	Chloroperlidae	*Chloroperlidae*	0										
		Alloperla	0	CG		1						1	
	Leuctridae	*Leuctridae*	0										
		Leuctra	0	SH	20	21	8	24	6	7	3	5	4
	Nemouridae	*Nemouridae*	2										
		Amphinemura	2	SH			1	3					
	Perlidae	*Perlidae*	2										
		Acroneuria	0	P	4	7	3	7	3	2		4	
		Paragnetina	1	P			2	2		1		2	

Trophic Level or Feeding Type: CG – Collector Gatherer SC – Scraper/Collector FC – Filterer/Collector P – Predator SH - Shredder

***Table A6. Upper Susquehanna Macroinvertebrate Data, 2000**—Continued*

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	FALLBK 0.5 6/5/00	RHIN 0.1 6/5/00	RHIN 4.5 6/5/00	JONS 0.1 6/5/00	SILV 4.1 6/5/00	SILV 0.1 6/5/00	SNAK 0.5 6/6/00	SNAK 5.0 6/6/00	SNAK 8.5 6/5/00
Plecoptera	Perlodidae	*Perlodidae*	2										
		Diploperla	2	P									
		Isoperla	2	P									
	Pteronarcyidae	*Pteronarcyidae*	0										
		Pteronarcys	0	SH						1			
Trichoptera	Hydropsychidae	*Hydropsychidae*	5										
		Cheumatopsyche	5	FC						3		2	
		Diplectrona	0	FC	9		10	2					2
		Hydropsyche	4	FC					1	3			1
	Philopotamidae	*Philopotamidae*	3										
		Dolophilodes	0	FC	32		9	7	10	24	3	26	18
	Polycentropodidae	*Polycentropodidae*	6										
		Neureclipsis	7	FC						2			
		Nyctiophylax	5	FC		3							
		Polycentropus	6	FC					1		2	2	1
	Rhyacophilidae	*Rhyacophilidae*	1										
		Rhyacophila	1	P									1
Oligochaeta: Haplotaxoda	Tubificidae	*Tubificidae*	10	CG									
Decopoda	Cambaridae	*Cambaridae*	6	P	2			1		1			
Bivalvia: Pelecypoda	Corbiculidae	*Corbicula*										1	

***Table A6. Upper Susquehanna Macroinvertebrate Data, 2000**—Continued*

Biological Index Scores	FALLBK 0.5	RHIN 0.1	RHIN 4.5	JONS 0.1	SILV 4.1	SILV 0.1	SNAK 0.5	SNAK 5.0	SNAK 8.5
	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/5/00	6/6/00	6/6/00	6/5/00
RAW SUMMARY									
Number of Individuals	109	93	136	117	114	112	87	101	92
% Shredders	18.3486	23.6559	6.6176	23.0769	5.2632	7.1429	3.4483	4.95055	4.3478
% Collector-Gatherers	11.0092	48.3871	25.7353	50.4274	55.2632	24.10716	63.2184	22.7723	35.8696
% Filterer-Collectors	40.3670	4.3011	16.9118	7.6923	11.4035	31.2500	11.4943	31.6832	25.0000
% Scrapers	18.3486	10.7527	41.1765	9.4017	14.9123	25.8929	20.6897	30.6931	27.1739
% Predators	11.9266	12.9032	9.5588	9.4017	13.1579	11.6071	1.1494	9.9010	7.6087
Number of EPT Taxa	12	9	12	9	15	13	9	15	12
Number of EPT Individuals	96	57	62	105	71	85	44	89	69
Number of Common Taxa	19	11	13	11	15	13	9	22	13
METRIC SCORES									
Taxonomic Richness	19	15	22	15	20	23	14	21	19
Diversity Index	3.33	2.99	3.65	2.72	3.46	3.79	2.80	3.64	3.67
Hilsenhoff Biotic Index	0.7890	3.7419	3.6324	0.6154	3.6930	2.6518	5.0920	1.8911	2.880
EPT Index	12	9	12	9	15	13	9	15	12
% Taxonomic Similarity	100	36.63	33.47	43.36	44.84	53.39	15.31	58.77	50.75
% Trophic Similarity	100	56.34	62.45	55.85	54.52	79.36	45.45	75.89	66.31

***Table A6. Upper Susquehanna Macroinvertebrate Data, 2000**—Continued*

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	SNAK 11.5 6/5/00	WLSC 0.1 6/6/00	LSNK 0.1 6/6/00	LSNK 5.0 6/6/00	FULL 0.5 6/7/00	FULL 1.5 6/7/00	FULL 2.5 6/7/00	FULL 3.5 6/7/00
Insecta: Coleoptera	Elmidae	Elmidae	5									
		Optioservus	4	SC	13							
		Stenelmis	5	SC				1		2	2	
	Psephenidae	Psephenidae	4									
		Psephenus	4	SC	5				3		2	
Diptera	Chironomidae	Chironomidae	7	CG	12	7	4	24	33	49	19	10
	Simuliidae	Simuliidae	6	FC				2	29	11		
	Tabanidae	Tabanidae	6									
		Tabanus	5	P								2
	Tipulidae	Tipulidae	4									
		Antocha	3	CG	1							
		Dicranota	3	P								
		Hexatoma	2	P		2			4	4	2	
		Tipula	4	SH				1				
Ephemeroptera	Ameletidae	Ameletidae	0					1				
		Ameletus	0	CG						1	4	7
	Baetidae	Baetidae	6									
		Acentrella	4	CG				3				
		Baetis	6	CG	12	10	11	9	5	2	1	2
		Centroptilum	2	CG				1		6		
	Ephemerellidae	Ephemerellidae	2									
		Drunella	1	SC	7		3	2				
		Ephemerella	1	SC	4		1	7				
		Serratella	2	SC								
	Ephemeridae	Ephemeridae	4									
		Ephemera	2	CG								

Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	SNAK 11.5 6/5/00	WLSC 0.1 6/6/00	LSNK 0.1 6/6/00	LSNK 5.0 6/6/00	FULL 0.5 6/7/00	FULL 1.5 6/7/00	FULL 2.5 6/7/00	FULL 3.5 6/7/000
Ephemeroptera	Heptageniidae	Heptageniidae	3									
		Epeorus	0	CG				2	5	29	51	24
		Heptagenia	4	SC		6	4	4				
		Stenacron	4	SC	1							
	Isonychiidae	Isonychiidae	2									
		Isonychia	2	FC								
	Leptophlebiidae	Leptophlebiidae	4									
		Leptophlebia	4	CG		30	7	12				6
		Paraleptophlebia	1	CG								
Megaloptera	Corydalidae	Corydalidae	3									
		Nigronia	2	P	4				1		1	
	Sialidae	Sialidae	4									
		Sialis	4	P								
Odonata	Aeshnidae	Aeshnidae	3									
		Boyeria	2	P								
	Gomphidae	Gomphidae	4									
		Stylogomphus albistylus	4	P				1				
Plecoptera	Chloroperlidae	Chloroperlidae	0									
		Alloperla	0	CG		9	2		1	1	2	6
	Leuctridae	Leuctridae	0									
		Leuctra	0	SH	9	20		3	29	14	25	50
	Nemouridae	Nemouridae	2									
		Amphinemura	2	SH				1			2	9
	Perlidae	Perlidae	2									
		Acroneuria	0	P	2	2	1		1	1	2	
		Paragnetina	1	P								

***Table A6. Upper Susquehanna Macroinvertebrate Data, 2000**—Continued*

Class: Order	Family	Genus	Pollution Tolerance Value	Trophic Level	SNAK 11.5 6/5/00	WLSC 0.1 6/6/00	LSNK 0.1 6/6/00	LSNK 5.0 6/6/00	FULL 0.5 6/7/00	FULL 1.5 6/7/00	FULL 2.5 6/7/00	FULL 3.5 6/7/000
Plecoptera	Perlodidae	Perlodidae	2									
		Diploperla	2	P	1			1				
		Isoperla	2	P								8
	Pteronarcyidae	Pteronarcyidae	0									
		Pteronarcys	0	SH								
Trichoptera	Hydropsychidae	Hydropsychidae	5									
		Cheumatopsyche	5	FC								
		Diplectrona	0	FC								
		Hydropsyche	4	FC	12			1				
	Philopotamidae	Philopotamidae	3									
		Dolophilodes	0	FC	52	1		11		2		1
	Polycentropodidae	Polycentropodidae	6									
		Neureclipsis	7	FC								
		Nyctiophylax	5	FC								
		Polycentropus	6	FC								
	Rhyacophilidae	Rhyacophilidae	1									
		Rhyacophila	1	P								
Oligochaeta: Haplotaxoda	Tubificidae	Tubificidae	10	CG						2		
Decopoda	Cambaridae	Cambaridae	6	P								3
Bivalvia: Pelecypoda	Corbiculidae	*Corbicula*										

Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued

Biological Index Scores	SNAK 11.5	WLSC 0.1	LSNK 0.1	LSNK 5.0	FULL 0.5	FULL 1.5	FULL 2.5	FULL 3.5
	6/5/00	6/6/00	6/6/00	6/6/00	6/7/00	6/7/00	6/7/00	6/7/00
RAW SUMMARY								
Number of Individuals	135	87	33	87	111	124	113	128
% Shredders	6.6667	22.9885	0	5.7471	26.1262	11.2903	23.8938	46.0938
% Collector-Gatherers	18.5185	64.3678	72.72733	58.6207	39.6396	72.5806	68.1416	42.9688
% Filterer-Collectors	47.4074	1.1494	0	16.0920	26.1261	10.4839	0	0.7813
% Scrapers	22.2222	6.8966	24.2424	16.0920	2.7027	1.6129	3.5398	0
% Predators	5.1852	4.5977	3.0303	2.2989	5.4054	4.03226	4.4248	10.1563
Number of EPT Taxa	9	7	7	13	5	7	6	8
Number of EPT Individuals	100	78	29	57	41	55	83	106
Number of Common Taxa	10	7	6	10	8	8	8	7
METRIC SCORES								
Taxonomic Richness	14	9	8	19	10	13	12	12
Diversity Index	2.99	2.6	2.61	3.37	2.43	2.61	2.34	2.8
Hilsenhoff Biotic Index	2.2519	2.95409	4.30309	3.93109	4.1172	3.7984	1.4779	1.3125
EPT Index	9	7	7	13	5	7	6	8
% Taxonomic Similarity	49.18	28.57	11.27	30.77	31.82	27.47	33.33	28.69
% Trophic Similarity	81.56	42	32.39	51.54	63.59	38.43	37.32	40.3

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