



**Missouri  
Department of  
Natural Resources**

**Biological Assessment Study**

**Little Lindley Creek  
Dallas County**

**2002-2003**

**Prepared for:**

**Missouri Department of Natural Resources  
Water Protection and Soil Conservation Division  
Water Pollution Control Program**

**Prepared by:**

**Missouri Department of Natural Resources  
Air and Land Protection Division  
Environmental Services Program  
Water Quality Monitoring Section**

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## **1.0 Introduction**

At the request of the Missouri Department of Natural Resources (**MDNR**) Water Pollution Control Program (**WPCP**), the Environmental Services Program (**ESP**) Water Quality Monitoring Section (**WQMS**) conducted a macroinvertebrate bioassessment of Little Lindley Creek in Dallas County near Buffalo, Missouri. Two stations on Little Lindley Creek were sampled with one station 1.5 miles downstream and the other 2.2 miles downstream of the Buffalo WWTF discharge (NPDES permit number MO-0094854). The Little Lindley Creek sampling stations were compared with ESP's Biological Criteria for Perennial/Wadeable Streams database for the Ozark/Osage Ecological Drainage Unit (**EDU**) and to four regional control streams of similar size to Little Lindley Creek within the Ozark/Osage EDU.

### **1.1 Study Area/Justification**

Little Lindley Creek originates in Dallas County north of Buffalo, Missouri and is listed in the Missouri Water Quality Standards as a class "C" stream for three miles to its confluence with Lindley Creek in Dallas County. Designated uses for Little Lindley Creek are "warm water aquatic life protection, human health/fish consumption, and livestock and wildlife watering." One mile of Little Lindley Creek has been placed on the 1998 303(d) list for high BOD and NFR as a result of discharge from the Buffalo Wastewater Treatment Facility (**WWTF**). The Buffalo WWTF discharges into a tributary of Little Lindley Creek and has a design flow of 462,000 gallons per day (gpd) or about 0.71 cubic feet per second (cfs).

In 2002, a study plan was submitted to the MDNR, WPCP (Appendix A). The ESP, WQMS was responsible for the proposed bioassessment study on Little Lindley Creek in Dallas County that included the following purpose, objectives, tasks, and null hypotheses.

### **1.2 Purpose**

The purpose of the study is to determine if Little Lindley Creek, Dallas County, is impaired by the Buffalo WWTF.

### **1.3 Objectives**

- 1) Determine if the macroinvertebrate community and water quality of Little Lindley Creek, Dallas County, is affected by the discharge of the Buffalo WWTF.
- 2) Assess the habitat quality for Little Lindley Creek and the four small regional control streams within the Ozark/Osage EDU.

### **1.4 Tasks**

- 1) Conduct a bioassessment of the macroinvertebrate community on Little Lindley Creek at two stations downstream of the Buffalo WWTF discharge.
- 2) Conduct a bioassessment of the macroinvertebrate community of four small regional control streams within the Ozark/Osage EDU (i.e. regional control stations).

- 3) Conduct a water quality assessment at the sampling stations to determine potential water quality impacts.
- 4) Conduct a habitat assessment at the sampling stations to ensure comparability of aquatic habitats.

### **1.5 Null Hypotheses**

- 1) The macroinvertebrate community will not differ between longitudinally separate reaches of Little Lindley Creek.
- 2) The macroinvertebrate community in Little Lindley Creek will not differ from reaches of biological criteria reference streams and reaches from similar sized regional control streams within the Ozark//Osage EDU.

### **2.0 Methods**

Carl Wakefield, Brian Nodine, and Randy Sarver of the Missouri Department of Natural Resources, Air and Land Protection Division, Environmental Services Program, Water Quality Monitoring Section conducted this study.

#### **2.1 Study Timing**

Macroinvertebrate and water quality samples were collected for one fall and spring season. Fall macroinvertebrate sampling and stream habitat assessment were conducted on September 24-26, 2002. Spring macroinvertebrate sampling was conducted from March 27 through April 1, 2003.

#### **2.2 Station Descriptions**

Figure 1 shows the location for the test stations on Little Lindley Creek. Table 1 provides legal description and descriptive information for the sample sites of Little Lindley Creek and the four small regional control stream sites.

Figure 1: Map of Little Lindley Creek and Sampling Stations

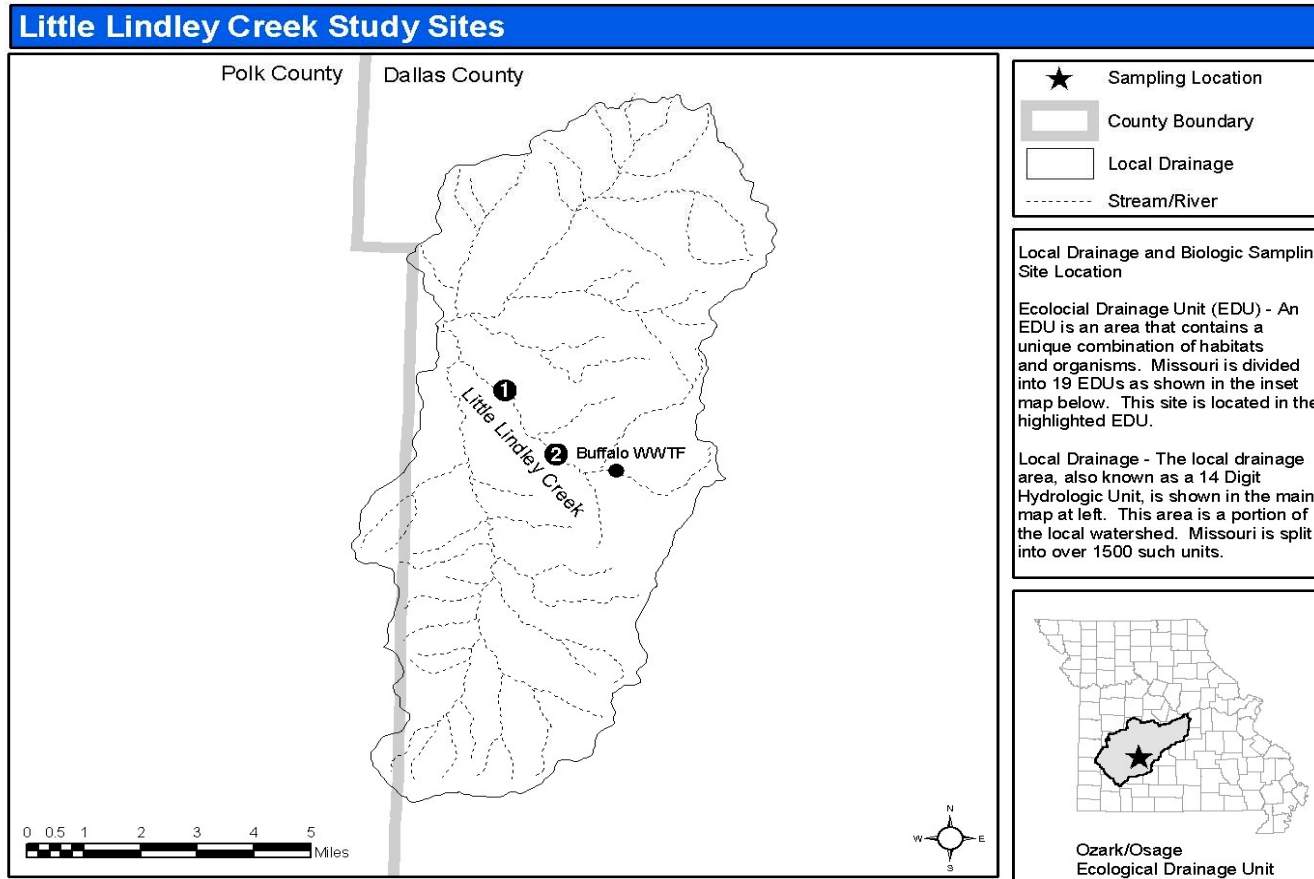


Table 1  
 Station Number, Legal Location, and Descriptive Information for the Test Stations  
 and Four Regional Control Stream Stations

Station Number	Location $\frac{1}{4}$ , Section, Township, Range	Description	County
Little Lindley Creek #1	N $\frac{1}{2}$ sec. 8, T. 34 N., R. 20 W.	Test-2.2 Miles Downstream of Buffalo WWTF Discharge	Dallas
Little Lindley Creek #2	N $\frac{1}{2}$ sec. 16, T. 34 N., R. 20 W.	Test-1.5 Miles Downstream of Buffalo WWTF Discharge	Dallas
Macks Creek #1	sec. 29, T. 38 N., R.19 W.	Regional Control	Camden
Starks Creek #1	sec. 23, T. 38 N., R. 20 W.	Regional Control	Hickory
Deer Creek #1	NE $\frac{1}{4}$ sec. 30, T. 40 N., R. 20 W.	Regional Control	Benton
Barren Fork #1	sec. 16, T. 39 N., R. 13 W.	Regional Control	Miller

### 2.2.1 Ecological Drainage Unit

An EDU is a region in which biological communities and habitat conditions can be expected to be similar. A map of the Ozark/Osage EDU is also included in Figure 1. All stations are within this EDU. Table 2 compares the land cover percentages from the Ozark/Osage EDU and 14-digit Hydrologic Units (HU), which contain the Little Lindley Creek test stations and the four regional control stream stations. Land cover data were derived from Thematic Mapper satellite data from 1991 to 1993 and interpreted by the Missouri Resource Assessment Partnership (MoRAP). Grassland is the dominant land use of the Little Lindley Creek watershed and the Ozark/Osage EDU, while most of the regional control streams have more forest cover than grassland in their watersheds (Table 2).

### 2.3 Habitat Assessment

A standardized assessment procedure was followed as described for Riffle/Pool Habitat in the Stream Habitat Assessment Project Procedure (SHAPP) (MDNR 2003). The habitat assessment was conducted on all stations during the fall 2002 sampling season.

### 2.4 Biological Assessment

Biological assessments consist of macroinvertebrate collection and physicochemical sampling for the two sample periods.



Table 2  
 Percent Land Cover

Land Cover	14-digit Hydrological Unit (HU)	Urban	Crops	Grassland	Forest	Swamp
EDU	Multiple Hydrological Units	0.3	1.5	49.7	43.4	0
Little Lindley Creek	10290107030001	1.2	0	75.3	22.9	0
Barren Fork	10290111010003	0	0.1	46.9	51.8	0
Deer Creek	10290109040001	0	0	42	50.8	0
Macks Creek	10290110020004	0.2	0	41.8	53.4	0
Starks Creek	10290110020003	0	0	48.9	48.4	0

#### 2.4.1 Macroinvertebrate Collection and Analysis

A standardized macroinvertebrate sample collection and analysis procedure was followed as described in the Semi-quantitative Macroinvertebrate Stream Bioassessment Project Procedure (SMSBPP) (MDNR 2003b). Three standard habitats (flowing water over coarse substrate, depositional substrate in non-flowing water, and root-mat) were sampled at all locations.

Macroinvertebrate data were analyzed using the four general biological metrics found in the SMSBPP. The four metrics used and found in the SMSBPP are: 1) Taxa Richness (**TR**); 2) Ephemeroptera/Plecoptera/Trichoptera Taxa (**EPTT**); 3) Biotic Index (**BI**); and 4) Shannon Diversity Index (**SDI**). The metric evaluations were done by comparing Little Lindley Creek sample stations on a seasonal basis to ESP's Biological Criteria for Perennial/Wadeable Streams database and to the small regional control stream reaches. The biological criteria database used minimally to unimpaired reference stream stations within the Ozark/Osage EDU.

#### 2.4.2 Physicochemical Collection and Analysis

Results are shown from physicochemical collections and analyses during each of the sampling periods during 2002 and 2003.

Physicochemical samples collected in fall 2002 and spring 2003 were: pH, temperature, conductivity, dissolved oxygen, discharge, turbidity, ammonia-N, nitrate + nitrite-N, Total Kjeldahl Nitrogen (TKN), chloride, and total phosphorus. Temperature, pH, conductivity, dissolved oxygen, and discharge measurements were conducted in the field.

All samples were collected per MDNR-FSS-001: Required/Recommended Containers, Volumes, Preservatives, Holding Times, and Special Sampling Considerations (MDNR 2003e). All samples were kept on ice until they were delivered to the ESP laboratory. The WQMS measured turbidity in the WQMS Biology Laboratory. All other samples were delivered to the ESP, Chemical Analysis Section for analyses.

Results of water quality analyses were compared to Missouri Water Quality Standards (MDNR 2000). Little Lindley Creek is classified as a Class C stream and a general warm-water fishery (GWWF). Waters designated as GWWF “allow the maintenance of a wide variety of warm-water biota, including naturally reproducing of recreationally important fish species”.

Two other criteria were included to identify limits. The first criterion was the reason for protection. In this case, values were identified for the “Protection of Aquatic Life”. The second was the rate of exposure, such as chronic or acute exposure. This was important to determine limits for pollutants that could be tolerated by aquatic life over a period of time.

#### **2.4.3 Discharge**

Stream flow was measured at each station using a Marsh-McBirney Flow Meter and discharge was calculated as cubic feet per second (cfs). Methodology was in accordance with the standard operating procedure Flow Measurement in Open Channels (MDNR 2003d).

#### **2.5 Data Analysis**

The physicochemical data were examined by variable to identify stations that had elevated levels that were above Water Quality Standards (MDNR 2000). Sampling stations that had elevated levels of certain variables were then discussed with possible influences being identified.

#### **2.6 Quality Control**

Quality control was used as stated in the various MDNR Project Procedures and Standard Operating Procedures. Duplicate samples were collected and analyzed for macroinvertebrate and physicochemical parameters. A random number of macroinvertebrate collections were rechecked for specimens missed during laboratory processing.

#### **3.0 Results and Analyses**

Three types of analyses were conducted to identify possible impacts to streams. A physical habitat assessment, biological assessment, and physicochemical water analysis were completed.

### 3.1 Habitat Assessment

Table 3 provides habitat assessment scores for Little Lindley Creek and small regional control sample reaches. Data were collected in September 2002 and Carl Wakefield and Randy Sarver did all scoring. According to the SHAPP, for a study site to fully support a biological community, the total score of the study site should be 75 to 100 percent similar to the total score of reference sites. Both of the Little Lindley Creek sample stations had higher habitat scores than the mean habitat score of the small reference control streams. These scores suggest that the test stations should be able to support a macroinvertebrate community comparable to the reference stations.

Table 3  
 Habitat Assessment Scores for Regional Control Stations and Test Stations, September 2002

Reference Streams	Habitat Score	Test Streams/Stations	Habitat Score	% of Mean Ref.
Macks Creek #1	108	Little Lindley Creek. #1	126	106
Starks Creek #1	110	Little Lindley Creek #2	123	104
Deer Creek #1	125	--	--	--
Barren Fork #1	132	--	--	--
Mean Reference Score	119	--	--	--

### 3.2 Biological Assessment

Macroinvertebrate data were evaluated by two methods. The first analysis used the general biological metrics in the SMSBPP. The second analysis of the biological data was an evaluation of macroinvertebrate community composition using percent composition of predominant macroinvertebrate taxa.

#### 3.2.1 Semi-quantitative Macroinvertebrate Stream Bioassessment Project Procedure (SMSBPP)

The SMSBPP metric evaluation used numeric biocriteria that were calculated from two sources. The first source was ESP's Biological Criteria for Wadeable and Perennial Streams database (Tables 4 and 5) and the second from the four small regional control streams (Tables 6 and 7) within the Ozark/Osage EDU. Since Little Lindley Creek is considerably smaller than streams in the biological criteria database, the four small regional control streams were chosen based upon similar low flow discharge. These streams were sampled since larger streams may have more available habitat and have higher macroinvertebrate taxa richness than smaller streams.

The metric values and scores for Little Lindley Creek are presented in Tables 8 through 11. Values in Tables 8 and 9 are scored using the biological criteria database reference scores and Tables 10 and 11 are scored using the four small regional control stream scores.

Table 4  
 Biological Criteria Database Scores for Warm Water Reference Streams Within  
 Ozark/Osage EDU, Fall Season

	Score = 5	Score = 3	Score = 1
TR	>84	84-42	41-0
EPTT	>18	18-9	8-0
BI	<6.63	6.63-8.32	8.33-10
SI	>3.22	3.22-1.61	1.60-0

Table 5  
 Biological Criteria Database Scores for Warm Water Reference Streams Within  
 Ozark/Osage EDU, Spring Season

	Score = 5	Score = 3	Score = 1
TR	>90	90-45	44-0
EPTT	>26	26-13	12-0
BI	<6.20	6.20-8.10	8.11-10
SI	>3.27	3.27-1.64	1.63-0

Table 6  
 Bioassessment Scores for the Four Small Regional Control Streams Within  
 Ozark/Osage EDU, Fall 2002

	Score = 5	Score = 3	Score = 1
TR	> 86	86-43	42-0
EPTT	>21	21-10	9-0
BI	<5.94	5.94-7.97	7.98-10
SI	>3.44	1.72-3.44	1.71-0

Table 7  
 Bioassessment Scores for the Four Small Regional Control Streams Within  
 Ozark/Osage EDU, Spring 2003

	Score = 5	Score = 3	Score = 1
TR	>103	103-51	50-0
EPTT	>30	30-15	14-0
BI	<5.90	5.90-7.95	7.96-10
SI	>3.43	3.43-1.71	1.70-0

Little Lindley Creek #1 scored a 12 and Little Lindley Creek #2 scored a 10 using both the biological criteria database and data from the small regional control streams for both sampling seasons (Tables 8-11). There was a decline in all four metric scores at the Little Lindley Creek test stations compared to the biological criteria database and the regional control stream stations. Little Lindley Creek #2 (upstream station) had much lower values for TR and EPT Taxa than Little Lindley Creek #1 (downstream station). Taxa Richness increased by 17 and EPT Taxa by

6 during the fall 2002 sampling season while TR increased by 19 and EPT taxa by 7 for the spring 2003 sampling season at Little Lindley Creek #1. The small regional control streams had higher values for the four biological metrics than the streams in the biological criteria database (Tables 4-7).

Table 8  
 Little Lindley Creek (LLC) Metric Values and Scores, Using Biological Criteria Database for Stations in Ozark/Osage EDU  
 Fall 2002

Sample #/Station	TR	EPTT	BI	SDI	T-Score	Sustainability
02-18111						
LLC #1 Value	66	12	6.89	2.49		
LLC #1 Score	3	3	3	3	12	Partial
02-18112						
LLC #2 Value	49	6	6.87	2.82		
LLC #2 Score	3	1	3	3	10	Partial

Table 9  
 Little Lindley Creek (LLC) Metric Values and Scores, Using Biological Criteria Database for Stations in Ozark/Osage EDU  
 Spring 2003

Sample #/Station	TR	EPTT	BI	SDI	T-Score	Sustainability
03-18687						
LLC #1 Value	70	16	6.88	2.96		
LLC #1 Score	3	3	3	3	12	Partial
03-18688						
LLC#2 Value	51	9	7.01	2.91		
LLC#2 Score	3	1	3	3	10	Partial

Table 10  
 Little Lindley Creek (LLC) Metric Values and Scores, Using Four Small Ozark/Osage EDU Regional Control Stations Data  
 Fall 2002

Sample #/Station	TR	EPTT	BI	SDI	T-Score	Sustainability
02-18111						
LLC #1 Value	66	12	6.89	2.49		
LLC #1 Score	3	3	3	3	12	Partial
02-18112						
LLC#2 Value	49	6	6.87	2.82		
LLC #2 Score	3	1	3	3	10	Partial

Table 11  
 Little Lindley Creek (LLC) Metric Values and Scores, Using Four Small Ozark/Osage EDU  
 Regional Control Stations Data  
 Spring 2003

Sample #/Station	TR	EPTT	BI	SDI	T-Score	Sustainability
03-18687						
LLC #1 Value	70	16	6.88	2.96		
LLC #1 Score	3	3	3	3	12	Partial
03-18688						
LLC#2 Value	51	9	7.01	2.91		
LLC#2 Score	3	1	3	3	10	Partial

**3.2.2 Macroinvertebrate Percent and Community Composition**

The number of Taxa Richness, EPT taxa, percent EPT, and percent composition for the five dominant macroinvertebrate families (DMF) at each station are presented in Tables 12 and 13. Values in the tables in bold type represent the five dominant macroinvertebrate families for each station.

Fall 2002 data showed that there were differences in the macroinvertebrate community between the Little Lindley Creek test stations and the regional control stream stations. The regional control streams had higher percent composition of stoneflies, caddisflies, isonychiidae, and hydracarina than the Little Lindley Creek test stations. Planaridae was much higher at Little Lindley Creek test stations than the regional control streams. Little Lindley Creek #2 had a higher percent composition of baetidae and elmidae while caenidae and heptageniidae were lower than Little Lindley Creek #1. Psephenidae was also much lower in percent composition at Little Lindley Creek #2 than Little Lindley Creek #1 and the regional control streams, except Starks Creek #1 (Table 12).

Spring 2003 data found that the regional control streams had a higher percent composition of stoneflies and caddisflies than the test stations of Little Lindley Creek. Crangonyctidae, Elmidae, and Planaridae were much higher at the Little Lindley test stations than at the regional control streams. Hydracarina and Hyalellidae were higher in the regional control streams, except for Starks Creek #1, than the Little Lindley Creek test streams (Table 13).

Table 12

Little Lindley Creek Test Stations and Regional Control Stations, Macroinvertebrate Composition per Station, Fall 2002

Variable-Station	Little Lindley Creek #1	Little Lindley Creek #2	Barren Fork #1	Deer Creek #1	Macks Creek #1	Starks Creek #1
Macro Sample Number	02-18111	02-18112	02-18109	02-18113	02-18115	02-18114
Total Taxa	66	49	84	106	87	98
Number EPT Taxa	12	6	20	25	25	21
% Ephemeroptera	54.32	30.72	34.49	20.19	33.04	42.27
% Plecoptera	0	0	0.63	0.17	0.08	0.08
% Trichoptera	6.43	3.91	10.60	7.58	12.20	6.57
% Dominant Macroinvertebrate Families (DMF; below)						
Caenidae	<b>40.67</b>	<b>17.21</b>	<b>20.35</b>	4.43	6.95	<b>24.24</b>
Chironomidae	<b>12.29</b>	<b>17.21</b>	<b>9.51</b>	<b>29.90</b>	<b>16.88</b>	<b>33.73</b>
Heptageniidae	<b>11.30</b>	3.91	<b>6.13</b>	<b>8.35</b>	<b>8.97</b>	<b>7.37</b>
Planaridae	<b>6.75</b>	<b>13.44</b>	0.31	0.26	1.45	0
Elmidae	<b>4.55</b>	<b>15.95</b>	4.95	<b>5.20</b>	<b>9.85</b>	<b>3.92</b>
Baetidae	2.25	<b>9.60</b>	1.02	0.85	2.99	2.24
Hyalellidae	3.75	5.98	<b>12.80</b>	<b>4.68</b>	<b>10.58</b>	0.96
Psephenidae	4.27	0.22	<b>9.58</b>	2.47	2.82	0.40
Hydropsychidae	1.59	2.51	5.42	0.68	<b>10.26</b>	0.72
Hydracarina	0.23	0	4.16	<b>7.41</b>	4.20	0.64
Isonychidae	0.09	0	4.40	3.15	3.47	<b>5.52</b>
Coenagrionidae	3.38	4.43	2.04	3.92	1.70	<b>3.92</b>

Table 13

Little Lindley Creek Test Stations and Regional Control Stations, Macroinvertebrate Composition per Station, Spring 2003

Variable-Station	Little Lindley Creek #1	Little Lindley Creek #2	Barren Fork #1	Deer Creek #1	Macks Creek #1	Starks Creek #1
Macro Sample Number	03-18687	03-18688	03-18682	03-18684	03-18683	03-18685
Total Taxa	70	51	108	114	96	105
Number EPT Taxa	16	9	33	31	30	29
% Ephemeroptera	29.98	19.49	28.09	25.20	20.92	36.30
% Plecoptera	2.39	0	11.37	1.30	5.02	11.97
% Trichoptera	1.16	0.98	5.11	7.32	4.17	2.00
% Dominant Macroinvertebrate Families (DMF; below)						
Chironomidae	<b>35.09</b>	<b>42.75</b>	<b>32.87</b>	<b>42.28</b>	<b>44.30</b>	<b>36.53</b>
Caenidae	<b>21.22</b>	<b>14.99</b>	<b>16.39</b>	<b>5.28</b>	<b>11.48</b>	<b>28.17</b>
Crangonyctidae	<b>11.73</b>	<b>5.16</b>	0.16	0.41	0	0.92
Heptageniidae	<b>8.59</b>	4.01	<b>8.73</b>	<b>8.70</b>	2.30	<b>4.60</b>
Elmidae	<b>8.26</b>	<b>16.71</b>	2.48	3.41	<b>4.25</b>	1.30
Planariidae	4.95	<b>4.42</b>	0.33	0.65	0.68	0.08
Perlodidae	0.25	0	<b>5.85</b>	0.24	1.11	2.61
Hydracarina	0.17	0	<b>4.53</b>	3.17	<b>10.63</b>	0.54
Tricorythidae	0	0	0.66	<b>6.91</b>	1.19	0.31
Hyaletellidae	0.74	0	3.21	<b>4.23</b>	1.02	0.61
Siphonuridae	0.08	0	0.16	1.30	<b>3.06</b>	0.69
Perlidae	1.98	0	0.41	0	1.19	<b>5.99</b>
Nemouridae	0.08	0	3.87	0.65	2.64	<b>2.76</b>



### **3.2.3 Physicochemical Water**

Physicochemical results are arranged to demonstrate trends of certain variables that may identify a source of impact to Little Lindley Creek. Results can be found in Table 14 for fall 2002 samples and in Table 15 for spring 2003 samples with values outstanding highlighted in bold. These tables compare the Little Lindley Creek test stations and the four regional control stream stations. Outstanding results for discharge, chloride, nitrate + nitrite-N, TKN, and total phosphorus by season are presented in this section.

#### **3.2.3.1 Discharge**

Discharge was 0.43 cfs at Little Lindley Creek #2 and 0.32 cfs at Little Lindley Creek #1 and ranged from 0.27 to 1.23 cfs at the regional control streams during the fall 2002 sampling season (Table 14).

Discharge was much higher during the spring 2003 sample season (Table 15). Discharge was 5.08 cfs at Little Lindley Creek #2 and 6.28 cfs at Little Lindley Creek #1 and ranged from 9.26 to 50.3 cfs at the regional control streams.

#### **3.2.3.2 Chloride and Nutrients**

Chloride and the nutrient parameters were elevated at the Little Lindley Creek test stations during the fall 2002 and spring 2003 sampling seasons. The nutrient parameters that were elevated at Little Lindley Creek were nitrate + nitrite-N, TKN, and total phosphorous.

##### **3.2.3.2.1 Chloride**

Chloride was 68.9 mg/L at Little Lindley Creek #2 and 67.9 mg/L at Little Lindley Creek #1 during the fall 2002 sampling season. Chloride values at the regional control stations ranged from <5.0 to 5.95 mg/L (Table 14). The elevated levels of chloride at Little Lindley Creek were well below the water quality standards (MDNR 2000) chronic value of 230 mg/L and acute value of 860 mg/L for the protection of aquatic life designation.

Chloride was 39.1 mg/L at Little Lindley Creek #2 and 34.8 mg/L at Little Lindley Creek #1 during the spring 2003 sampling season. Chloride values at the regional control stations ranged from 5.82 to 11.4 mg/L (Table 15).

##### **3.2.3.2.2 Nitrate + Nitrite-N**

Nitrate + nitrite-N was 22.4 mg/L at Little Lindley Creek #2 and 15.9 mg/L at Little Lindley Creek #1 during the fall 2002 sampling season. Nitrate + nitrite-N values for the regional control streams ranged from <0.05 to 0.09 mg/L (Table 14). The values at Little Lindley Creek were extremely high even though there are no water quality standards for nitrate + nitrite-N in the Missouri water quality standards (MDNR 2000) for protection of aquatic life designation. The only water quality standard for nitrate + nitrite-N is 10.0 mg/L for the designation of drinking water supply.

Nitrate + nitrite-N was 1.43 mg/L at Little Lindley Creek #2 and 1.08 mg/L at Little Lindley Creek #1 during the spring 2003 sampling season. Nitrate + nitrite-N values for the regional control streams ranged from 0.13 to 0.23 mg/L (Table 15).

**3.2.3.2.3 TKN**

All values for TKN were below detectable limits for all sampling stations during the fall 2002 sampling season (Table 14). TKN was 0.54 mg/L at Little Lindley Creek #2 and 0.34 mg/L at Little Lindley Creek #1 during the spring 2003 sampling season. Values for TKN were below detectable limits at the regional control stream stations (Table 15).

**3.2.3.2.4 Total Phosphorus**

Total phosphorus was 4.22 mg/L at Little Lindley Creek #2 and 1.81 mg/L at Little Lindley Creek #1 during the fall 2002 sampling season. Total phosphorus values at the regional control stream stations were below detectable limits (Table 14). Total phosphorus values at Little Lindley Creek were elevated, but there are no standards for total phosphorus in the water quality standards (MDNR 2000).

Total phosphorus was 0.45 mg/L at Little Lindley Creek #2 and 0.41 mg/L at Little Lindley Creek #1 during the spring 2003 sampling season. Total phosphorus values were below detectable limits at all of the regional control stream stations (Table 15).

Table 14  
 Physicochemical Variables for Little Lindley Creek Study During the Fall 2002  
 Sampling Season. Units mg/L unless otherwise noted.

Variable-Station	Little Lindley Creek #1 Test Fall 2002	Little Lindley Creek #2 Test Fall 2002	Macks Creek #1 Regional Control Fall 2002	Starks Creek #1 Regional Control Fall 2002	Deer Creek #1, Regional Control Fall 2002	Barren Fork #1, Regional Control Fall 2002
Phys/Chem Sample Number	02-28683	02-28682	02-28686	02-28684	02-28685	02-28681
Sample Date	09/25/2002	09/24/2002	09/26/2002	09/25/2002	09/25/2002	09/24/2002
Sample Time	0755	1645	0855	1215	1535	0855
pH (Units)	7.41	7.93	7.87	7.87	7.59	7.60
Temperature (C <sup>0</sup> )	16	18.5	18.5	19.5	23.5	17.5
Conductivity (uS)	743	780	456	418	415	454
Dissolved O <sub>2</sub>	6.20	10.1	7.02	7.54	7.95	5.75
Discharge (cfs)	0.32	0.43	1.19	0.47	1.23	0.27
Turbidity (NTUs)	6.61	1.50	<1	<1	2.38	2.04
Ammonia-N	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate + Nitrite-N	<b>15.9</b>	<b>22.4</b>	0.05	<0.05	<0.05	0.09
TKN	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chloride	<b>67.9</b>	<b>68.9</b>	<5	<5	<5	5.95
Total Phosphorus	<b>1.81</b>	<b>4.22</b>	<0.05	<0.05	<0.05	<0.05

Table 15  
Physicochemical Variables for Little Lindley Creek Study During the Spring 2003  
Sampling Season. Units mg/L unless otherwise noted.

Variable-Station	Little Lindley Creek #1 Test Spring 2003	Little Lindley Creek #2 Test Spring 2003	Macks Creek #1 Regional Control Spring 2003	Starks Creek #1 Regional Control Spring 2003	Deer Creek #1, Regional Control Spring 2003	Barren Fork #1, Regional Control Spring 2003
Phys/Chem Sample Number	03-00811	03-00812	03-00807	03-00809	03-00808	03-00806
Sample Date	04/01/2003	04/01/2003	03/26/2003	03/31/2003	03/31/2003	03/26/2003
Sample Time	1000	0820	1015	1305	1025	1335
pH (Units)	8.27	7.88	7.87	8.18	7.86	7.90
Temperature (C <sup>0</sup> )	11.5	10.0	11.0	12.0	9.0	14.0
Conductivity (uS)	412	422	381	346	330	369
Dissolved O <sub>2</sub>	12.0	7.80	7.38	12.1	8.17	11.5
Discharge (cfs)	6.28	5.08	11.4	25.3	50.3	9.26
Turbidity (NTUs)	5.75	7.80	3.70	<1.0	1.16	3.02
Ammonia-N	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate + Nitrite-N	<b>1.08</b>	<b>1.43</b>	0.22	0.13	0.21	0.23
TKN	<b>0.34</b>	<b>0.54</b>	<0.2	<0.2	<0.2	<0.2
Chloride	<b>34.8</b>	<b>39.1</b>	7.32	9.19	5.82	11.4
Total Phosphorus	<b>0.41</b>	<b>0.45</b>	<0.05	<0.05	<0.05	<0.05

#### 4.0 Discussion

The discussion describes possible effects of stream habitat and physicochemical conditions on the biological metric scores and the macroinvertebrate community composition.

#### 4.1 Habitat Assessment

Results of the stream habitat assessment of October 2002 suggest that the Little Lindley Creek test stations should be comparable to the regional control stream stations in their ability to support a similar quality macroinvertebrate community. Differences in biological metric scores and the macroinvertebrate community composition were probably not due to the habitat quality.

#### 4.2 Nutrient Enrichment Effects on Biological Metric Scores

The elevated physicochemical results for chloride, nitrate + nitrite-N, TKN, and total phosphorous were most likely causing the biological impairment at the Little Lindley test stations (Tables 14 and 15). Chloride, nitrate + nitrite-N, and total phosphorus were extremely high during the fall sampling season and were much higher than values for the spring sampling season. Water samples during the fall sampling season were collected during low flow conditions with no flow in Little Lindley Creek above the Buffalo WWTF, which could have led to the higher values for chloride, nitrate + nitrite-N, and total phosphorus. There was some flow in Little Lindley Creek above the Buffalo WWTF during the spring sampling season, which

could have diluted the levels of these parameters. All four biological metric values and scores from the Little Lindley Creek test sites showed impairment when compared to the biological criteria database and the small regional control streams for both sample seasons (Tables 8-11). Taxa richness, EPT taxa, and the Shannon Diversity Index were much lower and the Biotic Index was much higher at the Little Lindley Creek test stations than at biological criteria reference streams and the small regional control stream stations. Little Lindley Creek #1 showed improvement in all four metrics compared to Little Lindley Creek #2 during the spring sampling season, but only increased in taxa richness and EPT taxa during the fall sampling season (Tables 8-11). The much lower values for Taxa Richness and EPT taxa and much higher values for the Biotic Index indicated organic pollution was occurring at the Little Lindley Creek test sites.

#### **4.3 Nutrient Enrichment Effects on Macroinvertebrate Community Composition**

Fall 2002 data showed an increase in *Baetis*, *Caenis*, *Stenelmis*, and Planaridae while stoneflies, caddisflies, Heptageniidae, Isonychiidae, and *Psephenus herricki* declined at one or both of the Little Lindley Creek test stations compared to the small regional control streams (Table 12). During the spring 2003 sampling season, *Crangonyx*, *Stenelmis*, and Planaridae increased while stoneflies and caddisflies declined at one or both of the Little Lindley Creek test stations compared to the small regional control streams (Table 13). Planaridae (B.I. = 8.0) and *Crangonyx* (B.I. = 8.0) have high biotic index values while most mayflies, stoneflies, and caddisflies have low to moderate biotic index values. *Baetis* (B.I. = 6.0) and *Caenis* (B.I. = 7.6) are two mayfly genera that have fairly high biotic index values. Lower numbers of Heptageniidae (B.I. = 4.0), Isonychidae (B.I. = 3.8), and *Psephenus herricki* (B.I. = 2.5) indicated that there was organic pollution at the Little Lindley Creek test stations. *Stenelmis* was very abundant at Little Lindley Creek #2 during both sampling seasons. This genus was not identified to species due to difficulties in identifying larvae. A previous study by Brown (1972) found that *Stenelmis sexlineata* (B.I. = 6.4) was tolerant to moderate levels of organic pollution. It is not known what proportion of *Stenelmis* this species was, but *Stenelmis sexlineata* is a common species of Missouri streams. The abundance of more pollution tolerant organisms and a decrease in pollution intolerant organisms at the Little Lindley Creek test stations indicate that nutrient enrichment was impacting the macroinvertebrate community composition.

#### **5.0 Conclusions**

The first null hypothesis that the macroinvertebrate community would not differ between longitudinally separate reaches of Little Lindley Creek was accepted because both Little Lindley Creek test stations had a partial sustainability for the stream condition index.

The second null hypothesis that the macroinvertebrate community in Little Lindley Creek would not differ from reaches of biological criteria reference streams and reaches from similar sized regional control streams within the Ozark/Osage Ecological Drainage Unit (EDU) was rejected because the Little Lindley Creek test stations scored a partial sustainability score for the stream condition index when compared to both the biological criteria reference streams and the regional control streams. Little Lindley Creek #1 had a stream condition index of 12 and Little Lindley Creek #2 had a stream condition index score of 10 for both sample seasons. There were some

improvements in the biological metrics and macroinvertebrate community composition at Little Lindley Creek #1 compared to Little Lindley Creek #2. The macroinvertebrate community at the Little Lindley test stations were probably impacted by the discharge from the Buffalo WWTP for both sample seasons.

## **6.0 Literature Cited**

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## **Appendix A**

Missouri Department of Natural Resources  
Bioassessment Study Plan  
Little Lindley Creek, Dallas County  
September, 2003

**Missouri Department of Natural Resources**  
**Bioassessment Study Plan**  
**Little Lindley Creek, Dallas County**  
**Original - August 14, 2002**  
**Modified - September 30, 2002**

**Objective**

This study will characterize the aquatic macroinvertebrate community in Little Lindley Creek downstream from the city of Buffalo's Wastewater Treatment Facility (WWTF) to determine whether the stream is impaired and warrants continued 303(d) listing. Our specific objectives are to determine: 1) whether there is aquatic life impairment immediately downstream of the WWTF relative to regional reference streams; and 2) if aquatic life impairment is demonstrated near the WWTF, whether the community recovers downstream of this location.

Null Hypotheses

- 1) Macroinvertebrate assemblages will not substantially differ between Little Lindley Creek and similar size reference stream reaches within the Ozark/Osage River Ecological Drainage Unit (EDU).
- 2) The macroinvertebrate assemblages will not substantially differ between longitudinally separate reaches of Little Lindley Creek.

Background

A 1-mile segment of Little Lindley Creek, in western Dallas County, is presently on the 303(d) list for the pollutants of BOD & NFR. The upstream legal description is W ½, S15, T34N, R20W and the downstream legal description is NE ¼ S16, T34N, R20W. The WWTF is an oxidation ditch with a design flow of 0.91-cfs (0.59-MGD) and a reported actual flow of approximately 0.71-cfs (0.462-MGD). There are two permitted outfalls, #001 for the oxidation ditch, and #002 for a stormwater clarifier. The stormwater design flow is 3.9 MGD dependent upon precipitation.

**Study Design**

**General:** Two Little Lindley Creek stations will be surveyed. The general locations are as follows: 1) Little Lindley Creek #1 – Dallas Co., N ½, S8, T34N, R20W, downstream from highway C crossing and approximately 2.2 miles downstream from the discharge; and 2) Little Lindley Creek #2 – Dallas Co., N ½, S16, T34N, R20W, approximately 1.5 miles downstream from the discharge. In addition, four -five local unimpaired or minimally impaired streams will be surveyed. These include: 1) Macks Creek #1- Camden Co., S29, T38N, R19W, upstream from low water slab; 2) Starks Creek #1 – Hickory Co., S23, T38N, R20W, MDC Mule Shoe Addition; 3) Ingalls Creek #1 – Polk Co., S15, T35N, R21W, upstream from Hwy HH bridge



access; 4) Deer Creek #1 – Benton Co., NE ¼, S30, T40N, R20W, Forbes Lake of the Ozarks; and 5) Barren Fork – Miller Co., S16, T39N, R13W, uopstream from low water slab. These were selected using criteria for the establishment of reference stream conditions and will be used as local reference streams for the purpose of this study. Local references are necessary because Little Lindley Creek is not a natural perennial stream and is effluent dominated. In addition a size discrepancy exists between average wadeable perennial biological criteria streams and Little Lindley Creek so small reference streams will be used as references based upon low flow conditions.

Each station will consist of a length approximately 20 times the average stream width, and will contain at least two riffle areas, as outlined in the Semi-quantitative Macroinvertebrate Stream Bioassessment Project Procedure (SMSBPP) (MDNR 2003b). In order to assess variability among sampling stations, stream discharge, habitat assessment and water chemistry will be determined during macroinvertebrate surveys. Sampling will be conducted during the spring of 2002 and 2003 (March 15 through April 15).

**Biological Sampling Methods:** Macroinvertebrates will be sampled as per the guidelines of the Semi-Quantitative Macroinvertebrate Stream Bioassessment Project Procedure (SMSBPP). Each of the creeks in this study will be considered “riffle/pool” predominant streams; therefore samples will be collected from flow over coarse substrate, depositional (non-flow) and root-mat habitats. Each macroinvertebrate sample will be a composite of six subsamples within each habitat.

**Habitat Sampling Methods:** Stream discharge will be measured at each sampling location using a Marsh-McBirney flow meter according to MDNR-WQMS-113, Flow Measurements in Open Channels Standard Operating Procedure (MDNR 2003d) . Stream habitat assessments will also be conducted within each study area following the guidelines of Stream Habitat Assessment Project Procedure (SHAPP) (MDNR 2003c).

**Water Quality Sampling Methods:** Water samples from all sampled stations will be analyzed at the ESP laboratory for ammonia, nitrogen as NO<sub>2</sub> +NO<sub>3</sub>, total Kjeldahl nitrogen, total phosphorus, chloride and turbidity. Field measurements will include pH, conductivity, temperature and dissolved oxygen.

**Laboratory Methods:** All samples of macroinvertebrates will be processed and identified as per MDNR-FSS-209, Taxonomic Levels for Macroinvertebrate Identification (MDNR 2001). Turbidity samples will be analyzed at the MDNR biological laboratory

**Data Recording and Analyses:** Macroinvertebrate data will be entered in a Microsoft Access database in accordance with MDNR-WQMS-214, Quality Control Procedures for Data Processing (MDNR 2003a). Data analysis is automated within the Access database. Four standard metrics are calculated according to the SMSBPP: Total Richness (TR); Ephemeroptera, Plecoptera, Trichoptera Taxa (EPTT); Biotic Index (BI); and the Shannon Diversity Index (SDI) will be calculated for each reach. Additional metrics, such as Quantitative Similarity Index for Taxa (QSI-T), or Percent Scrapers (PS) may be employed to discern differences in taxa between control and impacted stations.

Macroinvertebrate data will be analyzed in two specific ways. First, a longitudinal comparison between the three reaches on Little Lindley Creek will be performed. Secondly, the data from the Little Lindley Creek sites will be compared to biological criteria from five local unimpaired, or minimally impaired, streams with the same low flow characteristics. The data from these streams will be used to calculate 25<sup>th</sup> percentiles for the four metrics of the SMSBPP.

**Data Reporting:** Results of the study will be summarized and interpreted in report format.

**Quality Control:** As stated in the various MDNR Project Procedures and Standard Operating Procedures.

### **Literature Cited**

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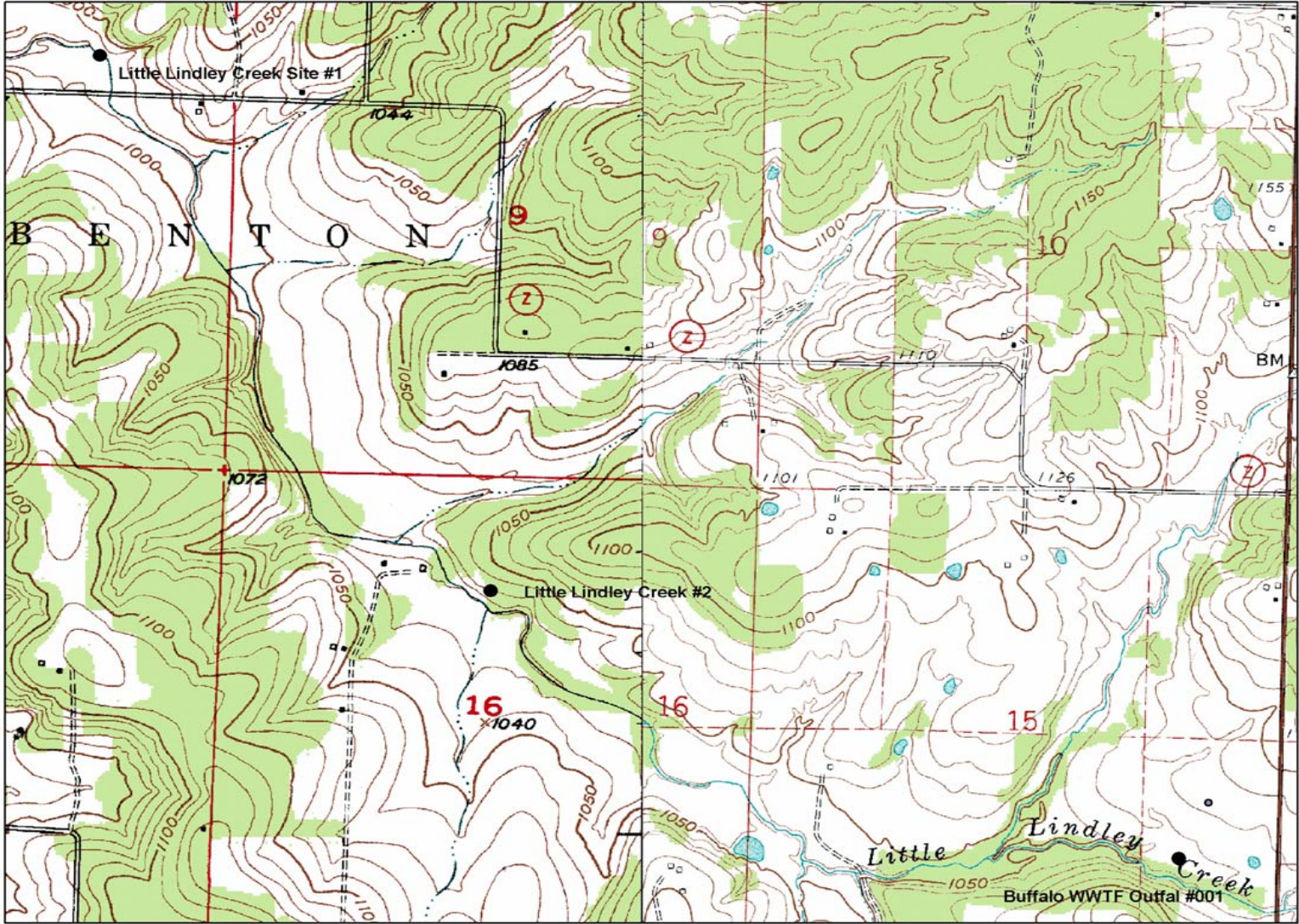
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### **Attachments**

Map of all sampling stations in this study



## **Appendix B**

Little Lindley Creek Bioassessment Study Macroinvertebrate Bench Sheets

**Aquatic Invertebrate Database Bench Sheet Report**

September 24, 2002 - Barren Fk [0218109], Station #1

**ORDER (Taxa)**

	CS	RM	SG	NF
Gordiidae	-99			
"HYDRACARINA"				
Acarina	47	1		5
<b>AMPHIPODA</b>				
Hyaella azteca	4	159		
Allocrangonyx				1
<b>COLEOPTERA</b>				
Berosus	12	1		
Psephenus herricki	116			1
Ectopria nervosa	4			1
Helichus lithophilus	2			
Scirtes		5		
Dubiraphia		17		2
Stenelmis	18			26
<b>DECAPODA</b>				
Orconectes luteus		-99		-99
Orconectes virilis		-99		
<b>DIPTERA</b>				
Tipula	2			
Limonia	1			
Forcipomyiinae	2			
Ceratopogoninae	4			
Ablabesmyia		1		6
Nilotanypus	3			
Corynoneura	2			
Cricotopus/Orthocladius	1			
Parametriocnemus	4			
Rheocricotopus	1			
Thienemanniella	3			
Chironomus		3		6
Cryptochironomus				1
Dicotendipes		6		1
Microtendipes		1		
Polypedilum convictum grp	30			
Polypedilum fallax grp		1		
Stenochironomus	1			
Polypedilum illinoense grp		4		
Pseudochironomus	14			
Paratanytarsus		5		
Rheotanytarsus	5			
Stempellinella	1			
Tanytarsus	6			1
Dixella		1		
Tabanus	-99			
Zavreliella	1			
Zavrelimyia				2
Thienemannimyia grp.	10			
Labrundinia	1			

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>EPHEMEROPTERA</b>				
Acerpenna	6			
Baetis	6			
Fallceon	1			
Isonychia bicolor	56			
Heptageniidae	3			2
Stenonema femoratum	1	1		34
Stenonema mediopunctatum	7			
Stenonema pulchellum	30			
Tricorythodes	29			
Caenis anceps	21			24
Caenis latipennis	14	8		192
Choroterpes				4
<b>HEMIPTERA</b>				
Microvelia		1		
<b>LEPIDOPTERA</b>				
Petrophila	8			
<b>LIMNOPHILA</b>				
Physella	16	4		
Helisoma	1			
Menetus	3	3		
Ferrissia	1	10		
Laevapex	3			
<b>LUMBRICINA</b>				
Lumbricidae		1		1
<b>MEGALOPTERA</b>				
Sialis	-99			
Corydalus	1			
<b>MESOGASTROPODA</b>				
Elimia	13	12		-99
<b>ODONATA</b>				
Calopteryx		1		
Argia	18	1		2
Enallagma		5		
Basiaeschna janata		-99		
Gomphus				1
Hagenius brevistylus	9			-99
Stylogomphus albistylus	16			
Erythemis		-99		
<b>PLECOPTERA</b>				
Zealeuctra	2			
Neoperla	5			1
<b>TRICHOPTERA</b>				
Chimarra	17			
Cheumatopsyche	65			
Hydropsyche	4			
Hydroptila	23			
Helicopsyche	8			
Triaenodes		18		
<b>TRICLADIDA</b>				
Planariidae	4			

**ORDER (Taxa)**  
TUBIFICIDA  
Tubificidae

**CS RM SG NF**

3

**Aquatic Invertebrate Database Bench Sheet Report**

September 25, 2002 - Little Lindley Ck [0218111], Station #1

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>"HYDRACARINA"</b>				
Acarina				5
<b>AMPHIPODA</b>				
Hyalella azteca		78		2
Crangonyx	4	7		11
Stygobromus				3
<b>ARHYNCHOBDSELLIDA</b>				
Erpobdellidae				-99
<b>COLEOPTERA</b>				
Hydroporus		2		1
Berosus	1	2		
Psephenus herricki	88			2
Ectopria nervosa				1
Scirtes		4		1
Dubiraphia		7		
Macronychus glabratus		1		
Stenelmis	54	7		28
<b>DECAPODA</b>				
Orconectes luteus	-99	-99		-99
Orconectes virilis		-99		
<b>DIPTERA</b>				
Ceratopogoninae				2
Ablabesmyia		3		19
Nilotanypus	2			
Procladius				1
Corynoneura	1	2		
Nanocladius		1		
Endochironomus				5
Chironomus				4
Cryptochironomus	1			1
Dicotendipes		7		37
Microtendipes		2		
Phaenopsectra				1
Polypedilum convictum grp	84			
Polypedilum illinoense grp	3	11		3
Cladotanytarsus				10
Paratanytarsus		19		2
Stempellinella	2	1		4
Tanytarsus	2	7		11
Hemerodromia	3			
Thienemannimyia grp.	13	2		
Labrundinia		1		
<b>EPHEMEROPTERA</b>				
Acerpenna	1			
Baetis	39			
Callibaetis		2		
Procloeon				6
Isonychia bicolor	2			
Stenacron	10			6



<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Stenonema femoratum	19	8		198
Caenis latipennis	30	80		757
<b>HEMIPTERA</b>				
Microvelia	3			
<b>LIMNOPHILA</b>				
Physella		3		
Menetus		3		1
Ferrissia		9		1
<b>LUMBRICULIDA</b>				
Lumbriculidae		1		
<b>MESOGASTROPODA</b>				
Hydrobiidae				1
Elimia	-99	6		
<b>ODONATA</b>				
Argia	23	30		3
Enallagma		16		
Basiaeschna janata		-99		
Hagenius brevistylus	3			
Stylogomphus albistylus	-99			
Epitheca (Tetragoneuria)		-99		
<b>RHYNCHOBDELLIDA</b>				
Glossiphoniidae		1		
<b>TRICHOPTERA</b>				
Chimarra	79	1		
Cheumatopsyche	34			
Hydroptila	1			
Triaenodes		22		
<b>TRICLADIDA</b>				
Planariidae	140	1		3
<b>TUBIFICIDA</b>				
Tubificidae				6
Branchiura sowerbyi				7
<b>VENEROIDEA</b>				
Sphaerium		-99		

**Aquatic Invertebrate Database Bench Sheet Report**

September 24, 2002 - Little Lindley Ck [0218112], Station #2

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>AMPHIPODA</b>				
Hyalella azteca		81		
Crangonyx	5	45		5
<b>ARHYNCHOBDELLIDA</b>				
Erpobdellidae	-99	1		-99
<b>COLEOPTERA</b>				
Psephenus herricki	3			
Scirtes		2		
Dubiraphia		4		6
Stenelmis	149	21		36
<b>DECAPODA</b>				
Orconectes virilis		-99		-99
<b>DIPTERA</b>				
Ablabesmyia	3			6
Corynoneura	23	3		1
Cricotopus/Orthocladus	4			1
Nanocladius	1			
Thienemanniella	5			
Endochironomus				9
Cryptochironomus		1		2
Dicrotendipes		1		2
Microtendipes	1			
Phaenopsectra		1		1
Polypedilum convictum grp	59			
Polypedilum illinoense grp	7	2		4
Polypedilum scalaenum grp	1			
Paratanytarsus		25		4
Rheotanytarsus	14	1		
Stempellinella	9	7		9
Tanytarsus	9	2		1
Hemerodromia		1		
Thienemannimyia grp.	9			
Labrundinia		5		
<b>EPHEMEROPTERA</b>				
Baetis	130			
Stenacron	5			1
Stenonema femoratum	6	2		39
Caenis latipennis	9	8		216
<b>HEMIPTERA</b>				
Rheumatobates		1		
<b>LIMNOPHILA</b>				
Physella		4		3
Menetus		5		1
Ancylidae		4		
<b>MESOGASTROPODA</b>				
Elimia	1			
<b>ODONATA</b>				
Calopteryx		3		
Argia	19	25		5

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Enallagma		11		
Basiaeschna janata		-99		
Hagenius brevistylus				1
<b>RHYNCHOBDELLIDA</b>				
Glossiphoniidae		2		
<b>TRICHOPTERA</b>				
Chimarra	19			
Cheumatopsyche	34			
<b>TRICLADIDA</b>				
Planariidae	169	10		3
<b>TUBIFICIDA</b>				
Tubificidae	1	7		13
<b>VENEROIDEA</b>				
Pisidium		1		
Sphaerium	2	1		1

September 25, 2002 - Deer Ck [0218113], Station #1

ORDER (Taxa)	CS	RM	SG	NF
"HYDRACARINA"				
Acarina	55	15		17
AMPHIPODA				
Hyalella azteca		52		3
Allocrangonyx				2
Stygobromus				3
COLEOPTERA				
Oreodytes				1
Berosus				2
Psephenus herricki	29			
Helichus lithophilus		3		
Scirtes		5		
Ancyronyx variegatus		1		
Dubiraphia		26		3
Macronychus glabratus		5		
Stenelmis	5	1		20
DECAPODA				
Orconectes luteus	-99			
Orconectes virilis		1		
DIPTERA				
Hexatoma	7			
Anopheles		5		
Culex		2		
Chaoborus				1
Dasyheleinae	1			
Forcipomyiinae	1	1		
Ceratopogoninae	3	1		10
Simulium	5			
Ablabesmyia	2	6		17
Nilotanypus	18	2		1
Procladius				13
Corynoneura	4	1		1
Cricotopus/Orthocladius	3			1
Nanocladius		2		
Parametriocnemus	28	1		
Rheocricotopus	9			
Thienemanniella	2	1		
Chironomus		1		38
Cryptochironomus	1			
Dicrotendipes		8		4
Microtendipes	1			
Paratendipes		5		8
Phaenopsectra	1	2		
Polypedilum	5			
Polypedilum convictum grp	34	4		
Stenochironomus	2			
Polypedilum illinoense grp	2			
Polypedilum scalaenum grp	2			1
Pseudochironomus				4

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Cladotanytarsus	6	2		4
Paratanytarsus		12		2
Rheotanytarsus	5			
Stempellinella	4			
Tanytarsus	14	5		14
Dixella		9		
Tabanus	2			
undescribed Empididae	2			
Clinotanypus		1		
Thienemannimyia grp.	30	1		9
Labrundinia	1	3		3
<b>EPHEMEROPTERA</b>				
Acerpenna	3			
Apobaetis				3
Procloeon		2		2
Isonychia bicolor	37	1		
Heptageniidae	33	1		
Stenacron	3			
Stenonema femoratum	1			
Stenonema mediopunctatum	3			
Stenonema pulchellum	52	5		
Tricorythodes	23			
Caenis anceps	11			
Caenis latipennis	5	5		31
Leptophlebiidae				5
Choroterpes	2			
Hexagenia				9
<b>HEMIPTERA</b>				
Microvelia	1			
<b>LIMNOPHILA</b>				
Physella	2	4		
Menetus	4	2		1
Ancylidae		9		
Ferrissia	14	9		1
<b>LUMBRICINA</b>				
Lumbricidae	3			2
<b>MEGALOPTERA</b>				
Sialis				1
Corydalus	-99			
<b>MESOGASTROPODA</b>				
Hydrobiidae		5		3
Elimia	18	20		
<b>ODONATA</b>				
Argia	23	2		
Enallagma		18		3
Boyeria		1		
Gomphus				-99
Hagenius brevistylus	3			
Stylogomphus albistylus	5			
Didymops				-99
Macromia		-99		-99

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Libellula				1
<b>PLECOPTERA</b>				
Perlinella ephyre	1			1
<b>RHYNCHOBDELLIDA</b>				
Glossiphoniidae		2		
<b>TRICHOPTERA</b>				
Chimarra	10			
Lype diversa		1		
Nyctiophylax		1		
Cheumatopsyche	5	3		
Oxyethira				8
Helicopsyche	40			
Mystacides				1
Triaenodes		8		
Oecetis	7	4		1
<b>TRICLADIDA</b>				
Planariidae		3		
<b>TUBIFICIDA</b>				
Tubificidae	2	6		11
Branchiura sowerbyi		5		5
Aulodrilus		1		
Limnodrilus hoffmeisteri				4
<b>VENEROIDEA</b>				
Sphaerium				2

**Aquatic Invertebrate Database Bench Sheet Report**

September 25, 2002 - Starks Ck [0218114], Station #1

**ORDER (Taxa)**

**"HYDRACARINA"**

Acarina

CS	RM	SG	NF
6	1		1

**AMPHIPODA**

Hyaella azteca

12

Allocrangonyx

5

**COLEOPTERA**

Berosus

1

Psephenus herricki

5

-99

Helichus basalis

2

1

Helichus lithophilus

1

Scirtes

9

Dubiraphia

18

4

Macronychus glabratus

10

Microcylloepus pusillus

5

Stenelmis

4

8

**DECAPODA**

Orconectes luteus

1

**DIPTERA**

Tipula

2

Hexatoma

-99

Anopheles

2

Chaoborus

1

Ceratopogoninae

1

3

Ablabesmyia

2

8

Nilotanypus

2

3

Procladius

3

Corynoneura

4

15

4

Cricotopus/Orthocladius

4

12

1

Nanocladius

1

Parametrioctenemus

3

Paraphaenocladius

1

Rheocricotopus

3

Thienemanniella

4

2

2

Chironomus

2

1

21

Cryptochironomus

3

Dicrotendipes

3

5

Glyptotendipes

1

Paralauterborniella

1

Microtendipes

4

Paratendipes

10

1

4

Parachironomus

1

Phaenopsectra

1

7

Polypedilum

2

Polypedilum convictum grp

65

2

Stenochironomus

1

Polypedilum illinoense grp

7

15

1

Polypedilum scalaenum grp

2

Pseudochironomus

2

Cladotanytarsus

3

1

10

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Paratanytarsus		17		6
Rheotanytarsus	27			1
Stempellinella	1	1		4
Tanytarsus	20	15		28
Dixella		7		
Myxosargus	1			
Tabanus	1			
Hemerodromia	1			
undescribed Empididae	1			2
Thienemannimyia grp.	27	9		1
Labrundinia		15		1
Diptera	1			
<b>EPHEMEROPTERA</b>				
Acerpenna	13	2		
Baetis	6			
Procloeon	1			6
Isonychia bicolor	68	1		
Heptageniidae	13	1		3
Stenonema femoratum	7			19
Stenonema mediopunctatum	27			
Stenonema pulchellum	22			
Tricorythodes	7	2		1
Caenis anceps	32	3		100
Caenis latipennis	91	19		59
Leptophlebiidae		3		9
Choroterpes	8			3
Hexagenia limbata				2
<b>HEMIPTERA</b>				
Microvelia	1			
Rhagovelia	2			
<b>ISOPODA</b>				
Caecidotea (Blind & Unpigmented)				2
<b>LIMNOPHILA</b>				
Physella	1			
Menetus		5		1
Ferrissia	2	4		13
<b>LUMBRICINA</b>				
Lumbricidae				1
<b>LUMBRICULIDA</b>				
Lumbriculidae	2			
<b>MEGALOPTERA</b>				
Sialis				-99
Corydalus	3			
<b>MESOGASTROPODA</b>				
Hydrobiidae	2			
Elimia				1
<b>ODONATA</b>				
Calopteryx		1		
Argia	16	9		8
Enallagma		16		
Boyeria		-99		



<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Hagenius brevistylus	2	1		2
Stylogomphus albistylus	4			1
Didymops				-99
<b>PLECOPTERA</b>				
Neoperla	1			
<b>TRICHOPTERA</b>				
Chimarra	28			
Cheumatopsyche	9			
Helicopsyche				1
Nectopsyche		2		
Triaenodes		27		
Oecetis	2	13		
<b>TUBIFICIDA</b>				
Tubificidae		1		1
Branchiura sowerbyi				1

**Aquatic Invertebrate Database Bench Sheet Report**

September 26, 2002 - Macks Ck [0218115], Station #1

**ORDER (Taxa)****"HYDRACARINA"**

	CS	RM	SG	NF
Acarina	38	11		3

**AMPHIPODA**

Hyaella azteca		131		
Allocrangonyx				-99

**COLEOPTERA**

Hydrophilidae	2			
Berosus	1	1		
Paracymus		1		
Psephenus herricki	6			9
Ectopria nervosa	3			17
Scirtes		3		
Dubiraphia		17		28
Macronychus glabratus		5		
Microcylloepus pusillus	3	6		
Stenelmis				63

**DECAPODA**

Orconectes luteus	-99			
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**DIPTERA**

Tipula	2			
Dasyheleinae	1			
Ceratopogoninae	1			1
Simulium	1			
Ablabesmyia				1
Nilotanypus	1			
Pentaneura	12			
Cricotopus bicinctus	2			
Cricotopus/Orthocladus	18	11		1
Parametricnemus	1			
Rheocricotopus	7			
Thienemanniella	35	6		16
Cryptochironomus				1
Dicrotendipes		1		1
Microtendipes	1			
Paratendipes				1
Polypedilum convictum grp	21			
Stenochironomus		5		
Polypedilum illinoense grp		1		1
Pseudochironomus	1			3
Paratanytarsus		10		2
Rheotanytarsus	33			
Tanytarsus	7			2
Tabanus	2			-99
Hemerodromia	3			
undescribed Empididae				1
Thienemannimyia grp.	5	1		
Labrundinia		1		

**EPHEMEROPTERA**

Acerpenna	27			
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<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Baetis	8			
Procloeon		1		1
Isonychia bicolor	43			
Heptageniidae	28			
Leucrocuta	1			
Stenonema femoratum		2		23
Stenonema mediopunctatum	46			
Stenonema pulchellum	11			
Eurylophella bicolor		1		
Tricorythodes	109	1		
Caenis anceps	10			
Caenis latipennis	17	11		48
Baetiscidae				1
Leptophlebiidae				14
Choroterpes				6
<b>HEMIPTERA</b>				
Rhagovelia	1			
Rheumatobates		5		
<b>ISOPODA</b>				
Caecidotea (Blind & Unpigmented)				2
<b>LIMNOPHILA</b>				
Physella		2		
Helisoma		-99		
Menetus		1		1
Ancylidae	2	1		5
<b>LUMBRICINA</b>				
Lumbricidae				1
<b>MEGALOPTERA</b>				
Sialis				-99
Corydalus	3			
<b>MESOGASTROPODA</b>				
Elimia	21	5		1
<b>ODONATA</b>				
Calopteryx		3		
Argia	4	4		3
Enallagma		10		
Basiaeschna janata		-99		
Gomphidae				6
Hagenius brevistylus				1
Ophiogomphus	2			4
<b>PLECOPTERA</b>				
Perlinella ephyre	1			-99
<b>TRICHOPTERA</b>				
Chimarra	2			
Polycentropodidae		1		
Cheumatopsyche	126	1		
Hydroptila	6			
Helicopsyche	2			
Nectopsyche		3		2
Triaenodes		4		
Oecetis		3		1

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>TRICLADIDA</b>				
Planariidae	8	2		8
<b>TUBIFICIDA</b>				
Branchiura sowerbyi				2

**Aquatic Invertebrate Database Bench Sheet Report**

March 26, 2003 - Barren Fk [0318682], Station #1

**ORDER (Taxa)****"HYDRACARINA"**

	CS	RM	SG	NF
Acarina	49	1		5
<b>AMPHIPODA</b>				
Hyalella azteca		39		
Allocrangonyx				1
Stygobromus	1			1
<b>COLEOPTERA</b>				
Peltodytes		1		1
Berosus	5	3		2
Enochrus		2		
Psephenus herricki	7	2		2
Ectopria nervosa	-99	1		2
Scirtes		1		
Dubiraphia		8		1
Stenelmis	1			20
<b>DECAPODA</b>				
Orconectes luteus		-99		
Orconectes virilis		-99		
<b>DIPTERA</b>				
Tipula	-99	-99		
Forcipomyiinae	1			1
Ceratopogoninae	4			4
Prosimulium	5			
Ablabesmyia		1		12
Larsia		1		
Procladius				1
Cricotopus bicinctus	5	11		
Corynoneura	12	20		8
Cricotopus/Orthocladius	53	34		2
Eukiefferiella	11	2		1
Orthocladius (Euorthocladius)	1			
Parametriocnemus	12			3
Rheocricotopus	5			
Hydrobaenus				2
Thienemanniella		1		
Synorthocladius		1		
Cryptochironomus				4
Dicrotendipes	1	5		6
Paratendipes	1			1
Polypedilum convictum grp	15			
Stictochironomus				3
Pseudochironomus		2		2
Cladotanytarsus	1			6
Micropsectra	1			
Paratanytarsus		8		
Rheotanytarsus				1
Stempellinella	2			12
Tanytarsus	29	8		17
Chaetocladius				1

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Myxosargus		1		
Tabanus	1			1
Dolichopodidae	1			
Clinocera	1			
Zavrelimyia		1		
Sympotthastia	26	5		3
Thienemannimyia grp.	5	8		15
Labrundinia		11		
<b>EPHEMEROPTERA</b>				
Siphonurus		2		
Acentrella	4			
Acerpenna	3			
Isonychia bicolor	5			
Heptageniidae	15			
Stenonema femoratum	22	16		41
Stenonema mediopunctatum	-99			
Stenonema pulchellum	11	1		
Eurylophella		1		
Tricorythodes	6			2
Caenis latipennis	57	70		72
Leptophlebiidae	1	2		
Leptophlebia	2	6		2
<b>HEMIPTERA</b>				
Microvelia		1		
<b>ISOPODA</b>				
Lirceus		2		
Caecidotea (Blind & Unpigmented)				1
<b>LEPIDOPTERA</b>				
Petrophila				1
<b>LIMNOPHILA</b>				
Fossaria	1			
Physella		1		4
Menetus		1		3
Ancylidae	2	4		
<b>LUMBRICULIDA</b>				
Lumbriculidae				3
<b>MEGALOPTERA</b>				
Nigronia serricornis	-99			
<b>MESOGASTROPODA</b>				
Elimia	4	27		4
<b>ODONATA</b>				
Calopteryx		-99		
Argia	2	1		
Enallagma		7		
Basiaeschna janata		-99		
Boyeria		-99		
Stylogomphus albistylus	4	1		1
Epitheca (Epicordulia)		-99		
Erythemis		-99		
Libellula		-99		
<b>PLECOPTERA</b>				

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Zealeuctra	1			2
Amphinemura	46			1
Chloroperlidae	7			5
Acroneuria	-99			
Neoperla	1			
Perlesta		3		1
Perlinella drymo		-99		
Perlodidae	13			
Clioperla clio		-99		
Isoperla	56			2
<b>TRICHOPTERA</b>				
Chimarra	2			1
Polycentropus	1	1		1
Cheumatopsyche	13			
Agapetus	1			
Hydroptila	17	10		4
Oxyethira		1		
Pycnopsyche		-99		
Helicopsyche	1	2		
Triaenodes	1	4		
Oecetis	1	1		
<b>TRICLADIDA</b>				
Planariidae	1	2		1
<b>TUBIFICIDA</b>				
Tubificidae				18
Enchytraeidae				1

**Aquatic Invertebrate Database Bench Sheet Report**

March 26, 2003 - Macks Ck [0318683], Station #1

**ORDER (Taxa)****"HYDRACARINA"**

	CS	RM	SG	NF
Acarina	81			44

**AMPHIPODA**

Hyaella azteca		12		
Allocrangonyx				1

**COLEOPTERA**

Berosus				1
Psephenus herricki	9			2
Dubiraphia	1	2		6
Stenelmis	9	1		31

**DIPTERA**

Tipula	1			
Hexatoma	1			1
Forcipomyiinae	1			
Ceratopogoninae	6	-99		16
Prosimulium	5			
Ablabesmyia		1		5
Procladius				1
Cricotopus bicinctus	1	3		
Corynoneura	1	7		7
Cricotopus/Orthocladius	54	111		16
Eukiefferiella	5			1
Orthocladius (Euorthocladius)	1			
Rheocricotopus	24			
Hydrobaenus	1			2
Thienemanniella	2	2		7
Cryptochironomus	1			1
Dicrotendipes	1	7		3
Paracladopelma				1
Microtendipes	8			5
Paratendipes				3
Phaenopsectra				9
Polypedilum convictum grp	8			
Stenochironomus				1
Polypedilum illinoense grp		11		1
Polypedilum scalaenum grp	1			
Stictochironomus				1
Pseudochironomus	7			
Cladotanytarsus	2			18
Paratanytarsus		15		2
Rheotanytarsus	1	4		
Stempellinella	1	1		6
Tanytarsus	9			12
Tabanus	1			
Hemerodromia	3	1		
Clinocera	1			1
undescribed Empididae				1
Zavreliomyia		1		
Potthastia	2	3		



<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Sympotthastia	37	6		1
Thienemannimyia grp.	13	7		5
Natarsia				1
Labrundinia		46		7
<b>EPHEMEROPTERA</b>				
Siphonurus		34		2
Acentrella	3			
Acerpenna	3			
Centroptilum		1		
Isonychia bicolor	11			
Heptageniidae	3			
Stenonema femoratum	10			6
Stenonema mediopunctatum	1	1		1
Stenonema pulchellum	5			
Ephemerellidae	1			
Eurylophella bicolor	3	2		4
Tricorythodes	12	1		1
Caenis latipennis	51	26		58
Baetisca lacustris				1
Paraleptophlebia	2	3		
Anthopotamus				-99
<b>ISOPODA</b>				
Caecidotea				3
<b>LIMNOPHILA</b>				
Fossaria	2			
Physella				1
Menetus	2			
Ancylidae				1
<b>LUMBRICINA</b>				
Lumbricidae				-99
<b>MEGALOPTERA</b>				
Corydalus	-99			
<b>MESOGASTROPODA</b>				
Elimia	7	13		2
Pleurocera	1			
<b>ODONATA</b>				
Argia	6			3
Enallagma		5		
Basiaeschna janata		1		
Hagenius brevistylus				1
Stylogomphus albistylus	2			-99
<b>PLECOPTERA</b>				
Amphinemura	31			
Chloroperlidae	1			
Neoperla	2			
Perlesta		3		
Perlinella drymo				-99
Perlinella ephyre	5			4
Isoperla	13			
<b>TRICHOPTERA</b>				
Chimarra	2			

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Polycentropus		1		-99
Cheumatopsyche	31	1		-99
Hydroptila	5	3		
Pycnopsyche		-99		
Helicopsyche	4			1
Oecetis				1
<b>TRICLADIDA</b>				
Planariidae	6			2
<b>TUBIFICIDA</b>				
Tubificidae				3
Branchiura sowerbyi				1

**Aquatic Invertebrate Database Bench Sheet Report**

March 31, 2003 - Deer Ck [0318684], Station #1

**ORDER (Taxa)**

	CS	RM	SG	NF
Gordiidae	1			
"HYDRACARINA"				
Acarina	32	2		5
<b>AMPHIPODA</b>				
Hyaella azteca		50		2
Allocrangonyx	1			2
Crangonyx	1			4
<b>COLEOPTERA</b>				
Oreodytes				6
Hydroporus		1		
Psephenus herricki	7			
Ectopria nervosa		1		
Dubiraphia		4		15
Microcylloepus pusillus		2		
Stenelmis	6			15
Lutrochus	1			
<b>DIPTERA</b>				
Tipula	1			-99
Gonomyia	1			
Hexatoma	7			2
Ceratopogoninae	2			1
Prosimulium	4			
Ablabesmyia		4		39
Procladius				28
Cricotopus bicinctus	1	1		1
Corynoneura		1		
Cricotopus/Orthocladius	33	64		10
Eukiefferiella	40	4		
Parakiefferiella				1
Parametriocnemus	66			2
Paraphaenocladius		2		
Rheocricotopus	16	1		
Hydrobaenus				4
Thienemanniella	1			
Cryptochironomus				2
Dicrotendipes		3		7
Cryptotendipes				2
Paralauterborniella				2
Demicryptochironomus				1
Robackia	2			
Paratendipes		1		11
Phaenopsectra		2		3
Polypedilum halterale grp				1
Polypedilum convictum grp	18	1		
Polypedilum illinoense grp	1	3		1
Polypedilum scalaenum grp				2
Stictochironomus				4
Einfeldia				1

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Pseudochironomus	1	1		4
Cladotanytarsus				3
Micropsectra		3		
Paratanytarsus		27		6
Rheotanytarsus	6	1		
Stempellinella				4
Tanytarsus	3	8		19
Dixella		1		
Tabanus	5			
Atherix	1			1
Hemerodromia	1			
Clinocera	1			
undescribed Empididae				1
Sympoththastia	2	2		3
Clinotanypus				2
Thienemannimyia grp.	10	5		12
Labrundinia		11		
<b>EPHEMEROPTERA</b>				
Siphonurus		15		1
Acentrella	10			
Acerpenna	2			
Centroptilum		1		
Isonychia bicolor	19			
Heptageniidae	22			3
Stenacron				1
Stenonema femoratum	5			7
Stenonema mediopunctatum	3			
Stenonema pulchellum	66			
Tricorythodes	85			
Caenis anceps		1		12
Caenis latipennis	19	12		21
Leptophlebia		1		
Paraleptophlebia	1	1		
Hexagenia				2
<b>LEPIDOPTERA</b>				
Petrophila	1			
<b>LIMNOPHILA</b>				
Fossaria				1
Physella		1		
Helisoma		-99		
Menetus	2			
Ferrissia	3	1		3
<b>LUMBRICULIDA</b>				
Lumbriculidae	4			
<b>MEGALOPTERA</b>				
Corydalus	2			
<b>MESOGASTROPODA</b>				
Hydrobiidae	1	1		1
Elimia	37	4		-99
<b>ODONATA</b>				
Calopteryx		1		

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Argia	1	2		2
Enallagma		9		2
Boyeria		1		
Hagenius brevistylus				1
Stylogomphus albistylus	2			3
Macromia				1
<b>PLECOPTERA</b>				
Leuctridae	1			1
Amphinemura	8			
Haploperla	3			
Isoperla	3			
<b>TRICHOPTERA</b>				
Chimarra	12			
Polycentropus	1			1
Cheumatopsyche	11			1
Agapetus	5			
Hydroptila	9	15		2
Pycnopsyche		1		
Neophylax	2			
Helicopsyche	20			
Mystacides				4
Triaenodes		2		
Oecetis		3		1
<b>TRICLADIDA</b>				
Planariidae	8			
<b>TUBIFICIDA</b>				
Tubificidae				3
Limnodrilus hoffmeisteri				3
Enchytraeidae				4
<b>VENEROIDEA</b>				
Sphaeriidae				2

**Aquatic Invertebrate Database Bench Sheet Report**

March 31, 2003 - Starks Ck [0318685], Station #1

**ORDER (Taxa)**

**"HYDRACARINA"**

Acarina 7

**AMPHIPODA**

Hyaella azteca 8

Crangonyx 1 9 2

**ARHYNCHOBDELLIDA**

Erpobdellidae -99

**COLEOPTERA**

Oreodytes 1

Hydroporus 1

Chaetarthria 1

Sperchopsis 1

Psephenus herricki 6

Helichus basalis 2

Scirtes 7

Dubiraphia 1 2 1

Macronychus glabratus 1

Microcylloepus pusillus 1 1

Stenelmis 2 8

**DECAPODA**

Orconectes luteus -99

Orconectes virilis -99

**DIPTERA**

Tipula -99

Dicranota 2

Hexatoma 2 2

Ceratopogoninae 1 2

Prosimulium 1

Ablabesmyia 3 4

Procladius 12

Cricotopus bicinctus 1 6

Corynoneura 2 1

Cricotopus/Orthocladius 26 15 4

Eukiefferiella 17 2 1

Orthocladius (Euorthocladius) 6 2

Parametriocnemus 29 2

Hydrobaenus 1 9

Cryptochironomus 1

Dicotendipes 2 3

Paralauterborniella 1

Robackia 1

Microtendipes 2

Paratendipes 41

Phaenopsectra 5 7

Polypedilum convictum grp 13

Polypedilum fallax grp 1

Polypedilum illinoense grp 1 17 2

Polypedilum scalaenum grp 1 3

Stictochironomus 1 6

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Pseudochironomus	1			4
Cladotanytarsus				11
Paratanytarsus	1	34		
Rheotanytarsus	1	2		
Stempellinella	3			4
Tanytarsus	19	26		73
Dixella		16		
Myxosargus		1		
Nemotelus	1			1
Tabanus	1			1
Hemerodromia	1			
Clinocera	2			1
Ephydriidae				1
Sympotthastia	19	10		2
Thienemannimyia grp.	8	2		1
Labrundinia		4		
<b>EPHEMEROPTERA</b>				
Siphonurus		8		1
Acentrella	10			
Isonychia bicolor	12			
Heptageniidae	16			
Stenonema femoratum	32	1		2
Stenonema mediopunctatum	8			
Stenonema pulchellum	1			
Ephemerella needhami	3			
Eurylophella bicolor		1		
Tricorythodes	4			
Caenis anceps	6			
Caenis latipennis	231	38		92
Leptophlebiidae		1		
Leptophlebia		3		1
Hexagenia limbata				2
<b>HEMIPTERA</b>				
Microvelia		1		
<b>LIMNOPHILA</b>				
Ancylidae	4			5
<b>LUMBRICINA</b>				
Lumbricidae	2	1		-99
<b>LUMBRICULIDA</b>				
Lumbriculidae	1			
<b>MEGALOPTERA</b>				
Corydalus	-99			
<b>MESOGASTROPODA</b>				
Elimia	3			
<b>ODONATA</b>				
Calopteryx		2		
Argia	2	3		1
Enallagma		4		
Basiaeschna janata		1		
Stylogomphus albistylus	4			1
<b>PLECOPTERA</b>				

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Amphinemura	35	1		
Chloroperlidae	8			
Acroneuria	1			
Perlesta	28	47		2
Clioperla clio	-99	1		
Isoperla	31	1		1
<b>TRICHOPTERA</b>				
Chimarra	6			
Polycentropus	1			
Cheumatopsyche	1			
Hydroptila	4	2		1
Pycnopsyche		2		
Helicopsyche		1		
Triaenodes		7		
Oecetis		1		
<b>TRICLADIDA</b>				
Planariidae	1			
<b>TUBIFICIDA</b>				
Tubificidae	2			2
Branchiura sowerbyi	1			1
Limnodrilus hoffmeisteri	1			
Enchytraeidae		2		
<b>VENEROIDEA</b>				
Corbicula				28



**Aquatic Invertebrate Database Bench Sheet Report**

April 1, 2003 - Little Lindley Ck [0318687], Station #1

**ORDER (Taxa)**

	CS	RM	SG	NF
Branchiobdellida		1		
"HYDRACARINA"				
Acarina		1		1
<b>AMPHIPODA</b>				
Hyaella azteca		6		3
Crangonyx	20	74		48
<b>ARHYNCHOBDELLIDA</b>				
Erpobdellidae	2			-99
<b>COLEOPTERA</b>				
Oreodytes		1		2
Berosus		1		-99
Psephenus herricki	16	-99		2
Stenelmis	93	1		6
<b>DECAPODA</b>				
Orconectes luteus	-99			-99
Orconectes virilis		-99		1
<b>DIPTERA</b>				
Tipula	1			
Ceratopogoninae	1			
Ablabesmyia		9		10
Nilotanypus	1			
Cricotopus/Orthocladius	14	43		4
Diplocladius	1			
Eukiefferiella	50	4		2
Nanocladius	1	5		
Parametriocnemus	1			1
Hydrobaenus	3	21		23
Chironomus				3
Cryptochironomus	1	1		1
Dicrotendipes	3	33		36
Paratendipes				5
Polypedilum convictum grp	39			
Polypedilum illinoense grp	3	27		1
Polypedilum scalaenum grp	1			1
Stictochironomus				9
Pseudochironomus				2
Cladotanytarsus				2
Micropsectra	2			
Paratanytarsus		17		2
Rheotanytarsus	4	8		
Stempellinella	1	1		2
Tanytarsus	3	5		1
Stratiomys	-99			
Thienemannimyia grp.	4	9		5
Diptera		1		2
<b>EPHEMEROPTERA</b>				
Siphonurus		1		
Centroptilum		-99		

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
Stenacron	17			1
Stenonema femoratum	71	3		12
Caenis latipennis	64	29		164
Paraleptophlebia		1		
<b>LIMNOPHILA</b>				
Physella		1		2
Menetus				1
Ferrissia		2		3
<b>LUMBRICULIDA</b>				
Lumbriculidae	1			2
<b>MESOGASTROPODA</b>				
Elimia	1	2		1
<b>ODONATA</b>				
Calopteryx		-99		
Argia	8	9		
Enallagma				1
Gomphus		-99		
Epitheca (Epicordulia)				-99
Somatochlora				-99
<b>PLECOPTERA</b>				
Amphinemura	1			
Chloroperlidae	1			
Perlesta	24			
Isoperla	3			
<b>TRICHOPTERA</b>				
Chimarra	5			1
Polycentropus	-99			
Cheumatopsyche	4	1		
Rhyacophila	-99			
Hydroptila		1		
Triaenodes		2		
<b>TRICLADIDA</b>				
Planariidae	56	3		1
<b>TUBIFICIDA</b>				
Tubificidae				1
Branchiura sowerbyi				-99
Enchytraeidae				1

**Aquatic Invertebrate Database Bench Sheet Report**

April 1, 2003 - Little Lindley Ck [0318688], Station #2

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>AMPHIPODA</b>				
Crangonyx	9	37		17
<b>ARHYNCHOBELLELLIDA</b>				
Erpobdellidae	5			-99
<b>COLEOPTERA</b>				
Berosus	1			
Psephenus herricki	1			
Dubiraphia				1
Stenelmis	191	2		10
<b>DECAPODA</b>				
Orconectes luteus	-99	-99		
<b>DIPTERA</b>				
Ceratopogoninae	1			1
Ablabesmyia		2		3
Corynoneura	1	1		
Cricotopus/Orthocladius	76	60		9
Eukiefferiella	7			
Nanocladius		1		
Parametriocnemus	1			
Hydrobaenus	2	11		24
Thienemanniella	2	1		
Cryptochironomus	4	1		2
Dicrotendipes	15	41		48
Microtendipes	1			
Paratendipes				15
Phaenopsectra	1	1		3
Polypedilum convictum grp	45	1		
Polypedilum illinoense grp	6	8		2
Polypedilum scalaenum grp	17			
Micropsectra		1		3
Paratanytarsus		6		
Rheotanytarsus	20	20		3
Stempellinella	4	2		1
Tanytarsus	14	3		3
Thienemannimyia grp.	17	12		1
Diptera				4
<b>EPHEMEROPTERA</b>				
Acentrella	1			
Centroptilum		4		
Stenacron	2			1
Stenonema femoratum	37	5		4
Caenis latipennis	65	25		93
Paraleptophlebia	1			
<b>LIMNOPHILA</b>				
Physella		-99		
Menetus	1	3		3
Ancylidae		1		8
<b>LUMBRICINA</b>				
Lumbricidae				3

<b>ORDER (Taxa)</b>	<b>CS</b>	<b>RM</b>	<b>SG</b>	<b>NF</b>
<b>ODONATA</b>				
Calopteryx		1		-99
Argia	20	13		-99
Enallagma		17		
<b>TRICHOPTERA</b>				
Cheumatopsyche	9	1		1
Hydropsyche	-99			
Hydroptila	1			
<b>TRICLADIDA</b>				
Planariidae	42	9		3
<b>TUBIFICIDA</b>				
Tubificidae	3	1		27
Limnodrilus hoffmeisteri				1
<b>VENEROIDEA</b>				
Sphaerium	4	7		2