BAY SHORE POWER PLANT
THERMAL MIXING ZONE BENTHIC STUDY:
PROGRESS REPORT

Kinectrics Report: 014307-001-RA-0002-R00

December, 2008

Darlene Ager, Ph.D.
Environmental Management Solutions and Services

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EXECUTIVE SUMMARY

As part of the NPDES permitting process, a survey of the benthic community in the vicinity of the thermal mixing zone of the Bay Shore Power Plant is required. Sampling is to be conducted at Maumee Bay within the thermal mixing zone for the Bay Shore Plant as well as at three (3) reference sites located outside of the thermal mixing zone. No sampling is to be conducted in the intake channel since it is a disturbed environment with regular dredging activities

Typically, benthic sampling is conducted twice annually to take into account both early and late emergent larvae, and presence/absence of cyanobacteria. For the 2008 field study, sampling was conducted in April and August 2008. This report provides a summary of results for the 2008 field study. Key results are outlined below.

- Collection of the mat-forming filamentous cyanobacterium *Lyngbya wollei* was a major focus for this study. This new invasive algae multiplies rapidly in warm water and is very resistant to freezing and cold weather. Algal samples were analyzed by Drs. Jeffrey Miner and Rex Lowe (Bowling Green State University) as well as an international cyanobacteria specialist Dr. Tom Bridgemean (University of Toledo). The samples were identified as *Plectonema*, a freshwater cyanobacterium that is very similar to *Lyngbya*. This species was observed at most sites including the reference sites.

- The Asiatic freshwater clam (*Corbicula fluminea*) is established in most of the major rivers in the United States. In the northern midwest (including the Great Lakes), it is typically confined to heated discharges because it cannot survive water temperatures less than 2.0^{o}C. During April 2008, the highest density (3,125 specimens per m^{2}) of the Asiatic clam (*Corbicula spp.*) was observed at Location #2. During August 2008, the highest density (1,693 specimens per m^{2}) of the Asiatic clam (*Corbicula spp.*) was also observed at Location #2.

- Three unionid species were observed in the vicinity of the station discharge including fawnsfoot (*Trucilla donaciformis*), three-ridge (*Amblema plicata plicata)* and pink heelsplitter (*Potamilus alatus*). During April 2008, the highest unionid density (17 specimens per m^2) was observed at Location #5. During August 2008, the highest unionid densities (13 specimens per m^2) were observed at Locations #2 and #3. Unionid species were not observed at any of the reference locations.

- Fawnsfoot (*Trucilla donaciformis)* was collected in the immediate vicinity of the station discharge at locations 1, 5 and 6 (April 2008) and locations 2 and 5 (August 2008). This species typically inhabits large rivers or the lower reaches of medium sized streams in sand or gravel. It is widespread and common throughout most of its range; however, it is identified as a threatened species in Ohio.

- For April 2008, a peak oligochaete density of 11,090 specimens per m^2 was observed in the immediate vicinity of the plant discharge (Location #2). A peak chironimid density of 817 specimens per m^2 was observed at Location #14.

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BAY SHORE POWER PLANT
THERMAL MIXING ZONE BENTHIC STUDY:
PROGRESS REPORT

1.0 INTRODUCTION

The Bay Shore Power Plant is located on the southern shore of Maumee Bay, near the mouth of the Maumee River, at the western end of Lake Erie, near Oregon, Ohio. Cooling water for Bay Shore is obtained from the Maumee River via an open intake channel and after traversing the condensers, is discharged to Maumee Bay (Figure 1).

A previous thermal mixing study was conducted by LMS in 2003 at the Bay Shore Plant. The results of this study indicated that the largest plume expected under worst-case conditions would not exceed 184 ha more than 5% of the time. During the summer period, the typical plume (50% exceedance) was estimated to be 34 ha.

The objective of this study is to conduct a benthic study at the Bay Shore Plant. Specific Tasks are as follows:

- Develop a sampling protocol for a statistically defensible study for determining the types and distribution of all benthic organisms with emphasis on Asiatic clams (*Corbicula*) and blue-green algae (e.g. *Lyngbya*).
- Develop a QA/QC program consistent with OEPA requirements
- Data analysis using statistical procedures
- Determine the impact of the thermal discharge from the Bay Shore on these organisms

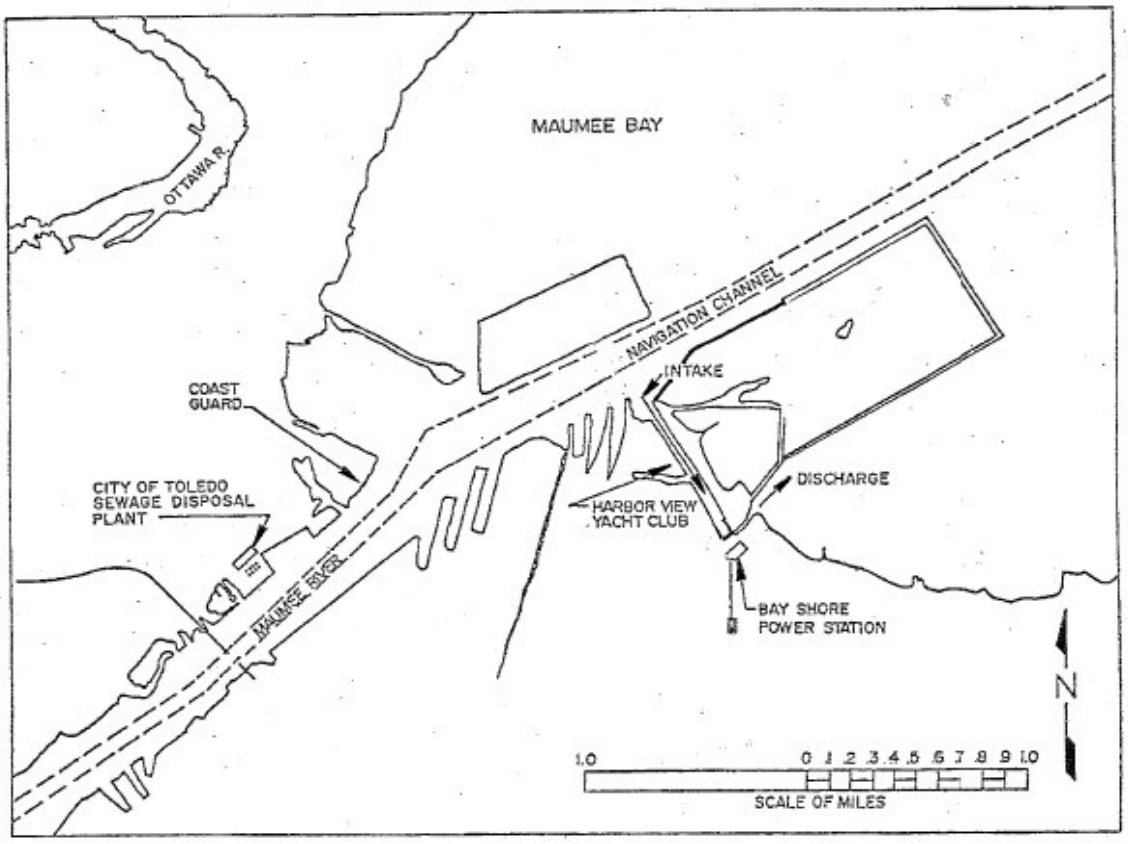


Figure 1. General Area Near the Bay Shore Power Plant

2.0 METHODS

Benthic sampling was conducted in the thermal mixing zone (20 sampling locations) and at three (3) reference sites in Maumee Bay during the spring (April 22-30, 2008) and fall (August 24 – September 7) of 2008. Sampling locations are illustrated in Figures 2 and 3.

Sampling and analytical procedures for the Bay Shore thermal mixing zone benthic study follow the Standard Operating Procedures (SOP's) developed by the US EPA for the Great Lakes National Program Office (GLNPO) Water Quality Survey of the Great Lakes:

- Standard Operating Procedure for Benthic Invertebrate Field Sampling. LG406. Revision 07, March 2002. http://www.epa.gov/glnpo/monitoring/procedures/Chapter_4/LG406.pdf

- Standard Operating Procedure for Benthic Invertebrate Laboratory Analysis. LG407. Revision 04, March 2002. http://www.epa.gov/glnpo/monitoring/procedures/Chapter_4/LG407.pdf

Variations from the GLNPO SOP for field sampling (LG406) are outlined below:

- ***Replicate Sampling:*** The GLNPO SOP recommends that three separate samples of benthic invertebrates be taken with a Ponar grab sampler at each designated sample site (LG406, Page 1, Section 2.1). However, results of a power analysis by Kinectrics on previously collected benthic data suggest that a minimum of four (4) samples are required per sampling location. This is the estimated number of samples required to determine a statistical effect if one was expected to occur. For the Bay Shore study, a total of four (4) separate samples of benthic invertebrates were therefore taken at each designated sample site.

- ***Sample Elutriation:*** The GLNPO SOP recommends that elutriation is used only when the sample contains too much large material to wash quickly through a 500-µm mesh sieve (LG406, Page 3, Section 5.3.1). Our experience in these waters indicates that the bottom is a combination of sand and mussel shells. As such, the elutriation process was always used at the thermal plume sites.

    - Each sample was weighed (i.e., full Ponar minus standard empty weight of Ponar), so that a gross estimate of sample mass can be made and an assessment of individual Ponar grabs can be made after sampling is completed.

    - A 19-L bucket was used for elutriation. The bucket was filled no more than 25% with sample, and water was added to the 75% line. The sample was gently agitated and 50% of the water was poured off. This process was repeated eight (8) times as indicated in the SOP (LG406, Page 3, Section 5.3.4). The water (and organisms) drawn off were filtered through a 500-µm mesh sieve and the collected material was preserved. If the sample filled the bucket to greater than 25%, the sample was split in half and elutriation of each partial sample was completed. Collected material from these subsampled elutriations were pooled back into one sample.

- ***Sample Preservation:*** The SOP (LG406, Page 4, Section 6.2.2) calls for a 5-10% formaldehyde final concentration. We believe this should say a 5-10% formalin solution which is 1.85-3.7% formaldehyde (because 100% formalin = 37% formaldehyde). The sample volume was determined and sufficient formalin was added to obtain a final concentration of 5-10% formalin.

- ***Benthos Field Documentation:*** Field technicians completed field logs to indicate deviations from normal sampling procedure. However, in contrast to the SOP (LG406, Page 4, Section 6.4.2) an onboard computer database was not completed.

- ***Mounting of Oligochaetes and Chironomids:*** If large numbers of chironomids and oligochates were encountered (n > 40 per taxon per sample), then the number of specimens mounted was limited to 40 randomly identified individuals per taxon. All other individuals of that taxon in a sample were identified to the lowest practical taxon from samples in Petri dishes and using a dissecting microscope. QA/QC including chironomid identification was conducted by Mr. Henry Kowalyk, a recognized benthic taxonomist (Kowalyk 1985). Given that four replicate samples were taken at each sampling site, there were up to 160 specimens per taxon (i.e., Chironomidae or oligochaete) mounted. This provides a good representation of the distribution for lower practical taxonomic characterizations of these taxa. *Chironomid ID was not completed at the time of this progress report.*

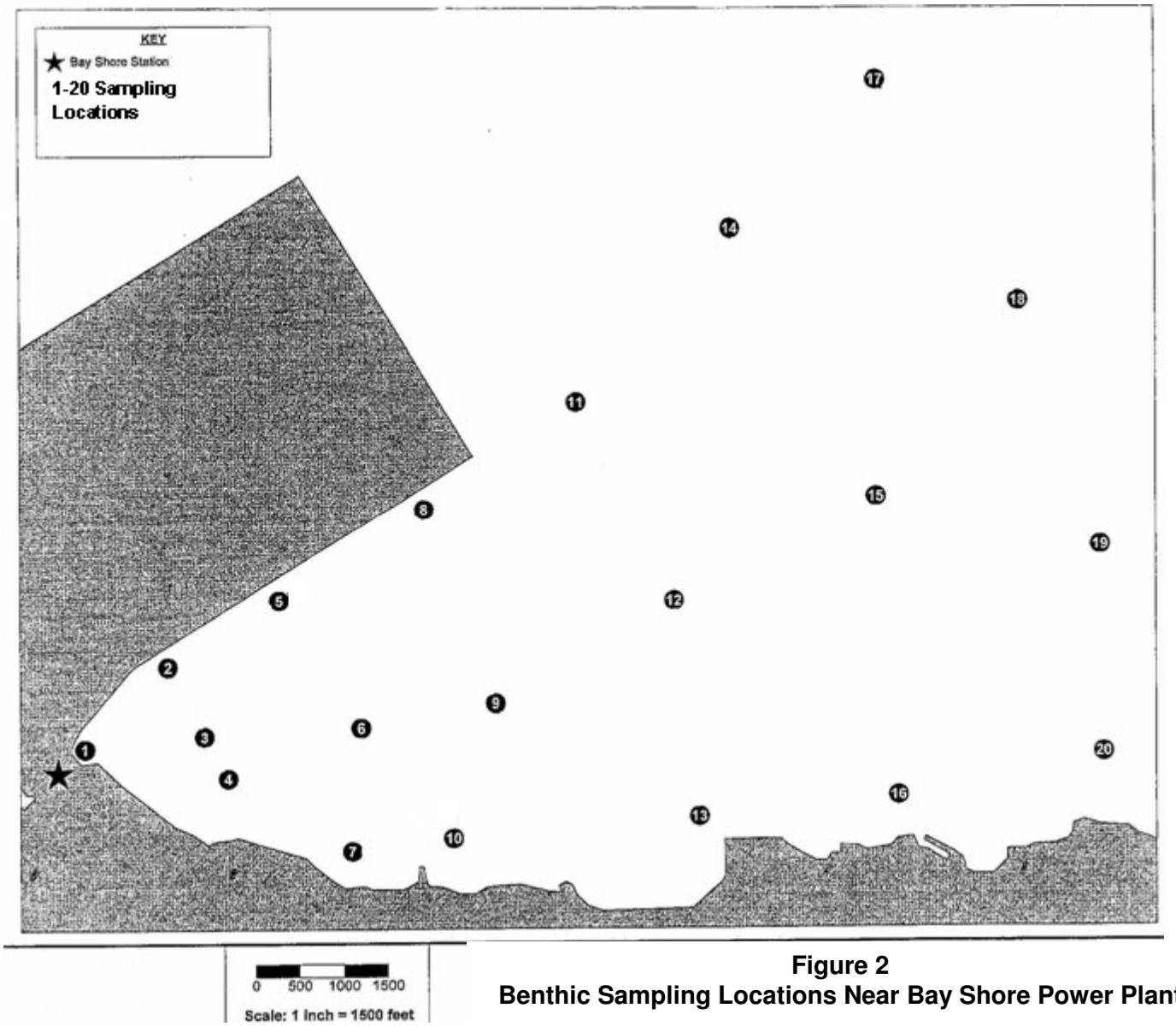


Figure 2
Benthic Sampling Locations Near Bay Shore Power Plant

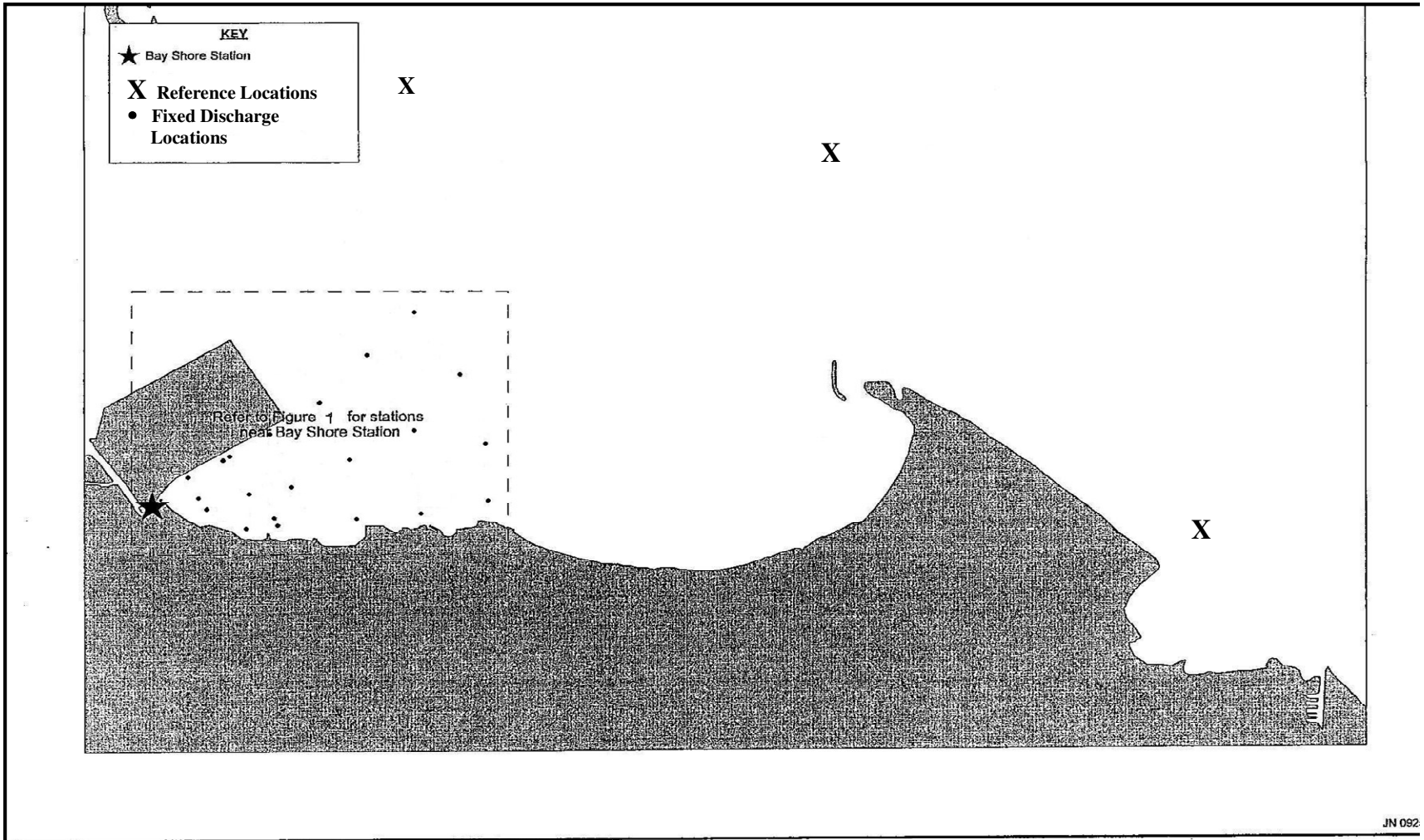


Figure 3
Remote Sampling Locations Near Bay Shore Power Plant

3.0 RESULTS

3.1 Physical Conditions

Benthic sampling was conducted at Bay Shore Power Plant in the spring (April 22-30, 2008) and fall (August 24 – September 7) of 2008. A summary of sampling locations, GPS coordinates and substrate descriptions is presented in Table 1.

Table 1. Sample Locations and Substrate Descriptions

Location	April 2008		August 2008		Substrate
	Latitude	Longitude	Latitude	Longitude	
1	Bayshore bridge		Bayshore bridge		Rock/Corbicula
2	41°41.744N	83°26.081W	41°41.756N	83°26.081W	corbicula only -no sediment
3	41°41.671N	83°26.038W	41°41.663N	83°26.030W	silt/corbicula
4	41°41.612N	83°26.039W	41°41.604N	83°26.025W	sandy silt & corbicula
5	41°41.877N	83°25.772W	41°41.873N	83°25.777W	sand and bivalves
6	41°41.685N	83°25.854W	41°41.674N	83°25.851W	silt/clay/corbicula
7	41°41.534N	83°25.889W	41°41.534N	83°25.884W	all sand
8	41°42.043N	83°25.423W	41°42.072N	83°25.393W	not recorded
9	41°41.677N	83°25.645W	41°41.671N	83°25.669W	silt/clay/corbucula
10	41°41.557N	83°25.722W	41°41.548N	83°25.725W	silt&corbicula
11	41°42.347N	83°24.943W	41°42.352N	83°24.942W	silt&bivalves
12	41°41.886N	83°24.762W	41°41.895N	83°24.780W	sand&bivalves
13	41°41.529N	83°24.627W	41°41.526N	83°24.630W	clay covered with mussels
14	41°42.550N	83°24.688W	41°42.560N	83°24.689W	mud
15	41°41.979N	83°23.472W	41°41.978N	83°23.472W	sandy/gravel
16	41°41.574N	83°24.195W	41°41.569N	83°24.211W	clay/mud/sand mix
17	41°42.857N	83°24.679W	41°42.906N	83°24.655W	ZM on surface and then mud below
18	41°42.726N	83°22.214W	41°42.723N	83°22.230W	hard sand & bivalves
19	41°42.316N	83°22.102W	41°42.324N	83°22.090W	sandy silt
20	41°41.370N	83°21.732W	41°41.364N	83°21.743W	hard sand & bivalves
21 (R1)	41°44.272N	83°23.105W	41°44.292N	83°23.094W	mud&bivalves
22 (R2)	41°43.377N	83°20.232W	41°43.378N	83°20.202W	sand
23 (R3)	41°41.356N	83°18.024W	41°41.354N	83°18.025W	hard sand

A detailed summary of physical data (wind direction and velocity, water depth, turbidity, temperature, transparency, pH, conductivity, DO) is presented in Appendices 1-2.

3.2 Mollusc Abundance

Detailed summaries of mollusc specimens collected for each sample are presented in Appendices 3-4. Mean densities for the Asiatic freshwater clam (*Corbicula fluminea*), Dressinids (quagga mussel, zebra mussel) and unionids are summarized in Table 2 and Figures 4-7.

Table 2. Mollusc Abundance (# per m^2)

Location	April 2008			Aug-Sept 2008		
	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid
1	52.1	108.5	4.3	0.0	0.0	0.0
2	3125.0	13.0	8.7	1,692.7	0.0	13.0
3	282.1	21.7	8.7	182.3	47.7	13.0
4	0.0	0.0	0.0	138.9	408.0	4.3
5	225.7	0.0	17.4	73.8	0.0	4.3
6	160.6	8.7	4.3	138.9	4.3	0.0
7	34.7	4.3	0.0	395.0	30.4	0.0
8	169.3	0.0	0.0	91.1	8.7	0.0
9	243.1	4.3	0.0	147.6	4.3	4.3
10	65.1	8.7	0.0	373.3	52.1	0.0
11	0.0	65.1	0.0	195.3	980.9	0.0
12	0.0	182.3	0.0	8.7	928.8	0.0
13	395.0	169.3	4.3	156.3	360.2	0.0
14	0.0	21.7	0.0	0.0	642.4	0.0
15	0.0	186.6	0.0	0.0	1,983.5	0.0
16	0.0	21.7	0.0	438.4	65.1	0.0
17	0.0	0.0	0.0	4.3	325.5	0.0
18	0.0	156.3	0.0	0.0	2,083.3	0.0
19	0.0	0.0	0.0	0.0	1,132.8	0.0
20	0.0	104.2	0.0	0.0	2,400.2	0.0
21	0.0	351.6	0.0	0.0	2,734.4	0.0
22	0.0	82.5	0.0	4.3	21.7	0.0
23	0.0	195.3	0.0	0.0	91.1	0.0

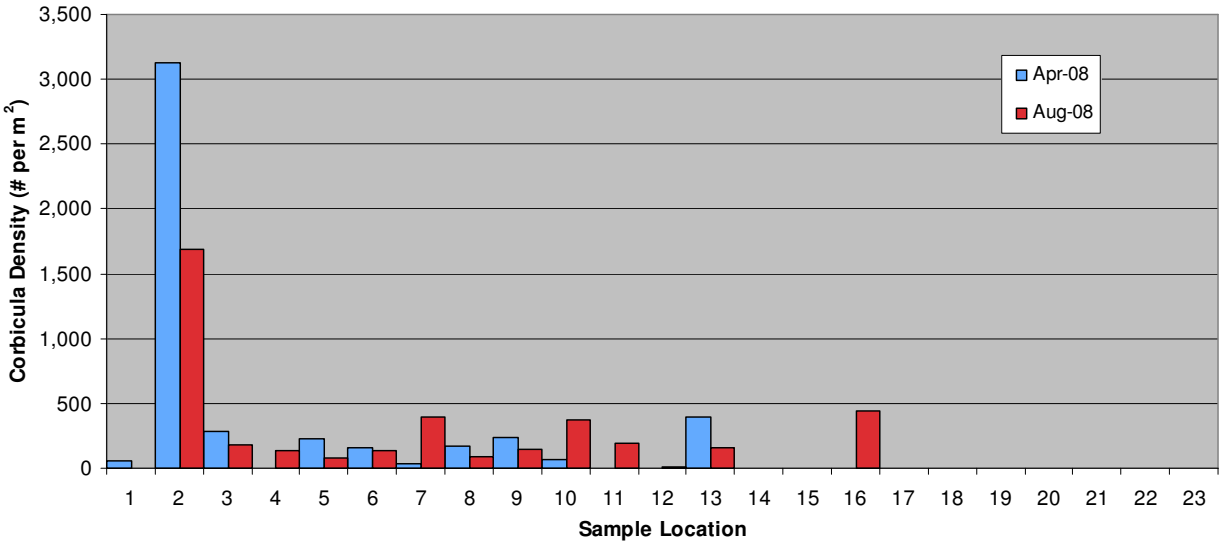


Figure 4. Corbicula Density: April vs August, 2008

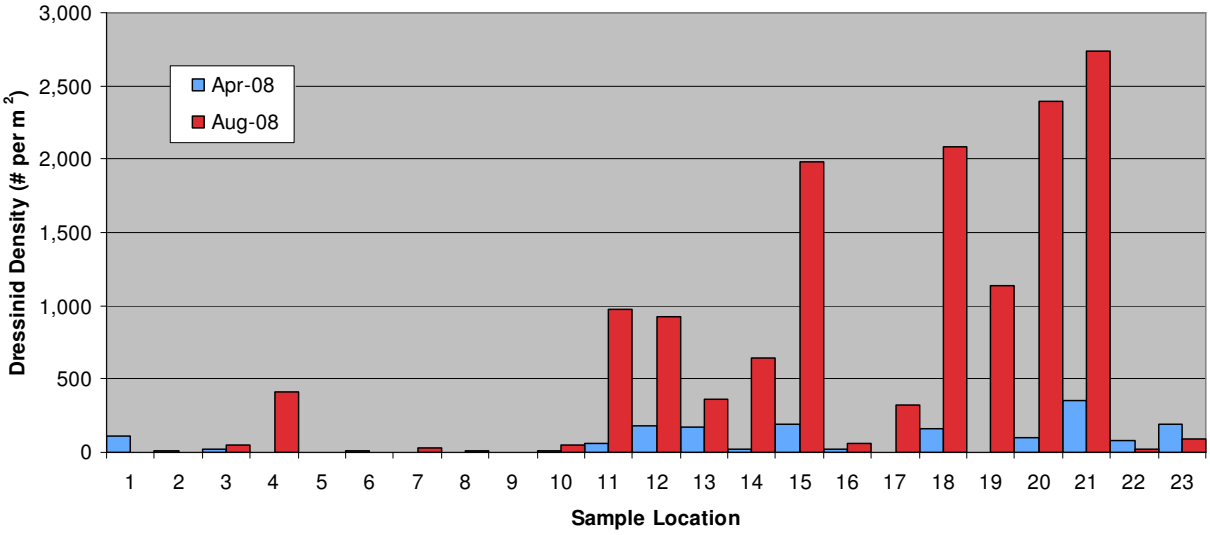


Figure 5. Dressinid Density: April vs August, 2008

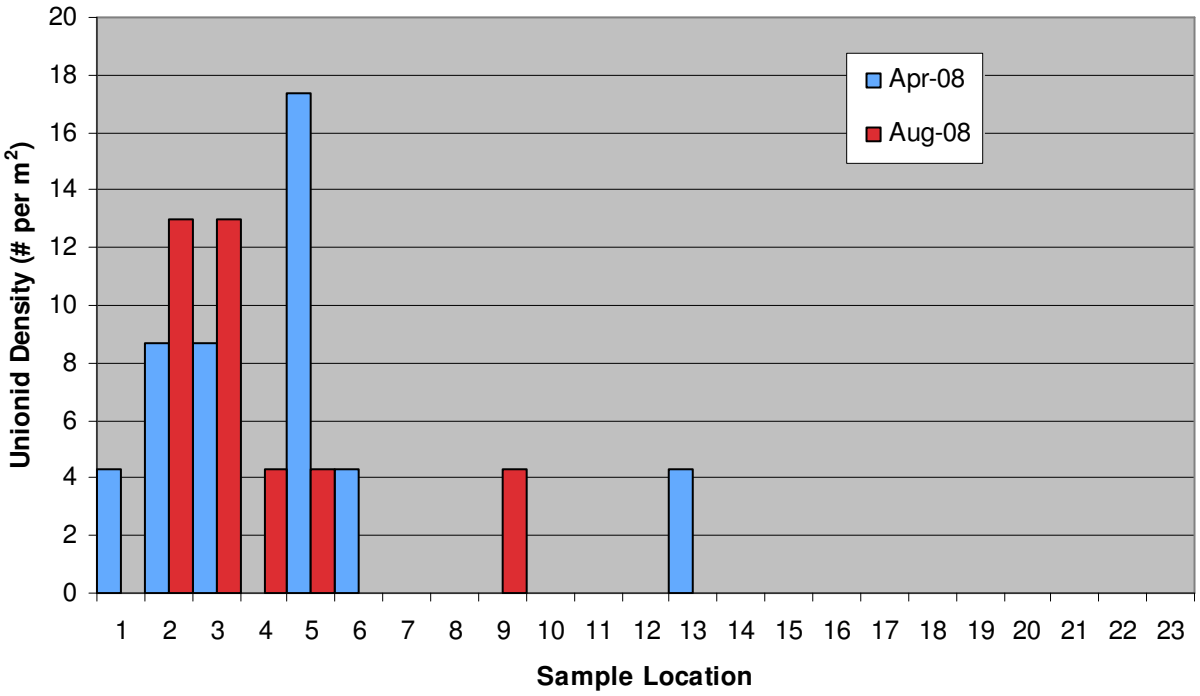


Figure 6. Unionid Density: April vs August, 2008

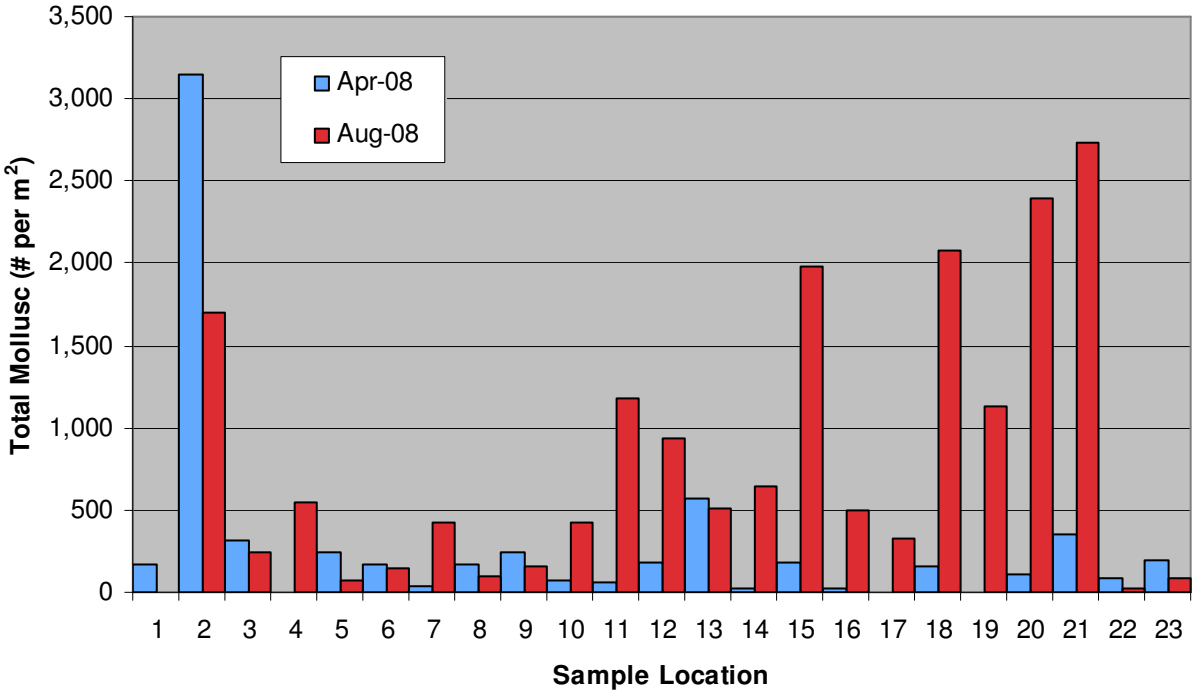


Figure 7. Total Mollusc Density: April vs August, 2008

Corbicula spp. The Asiatic freshwater clam (*Corbicula fluminea,* Figure 8) is established in most of the major rivers in the United States. In the northern midwest (including the Great Lakes), it is typically confined to the heated discharge plumes of power plants because it cannot survive water temperatures less than 2.0°C (French et al., 1991).

April 2008: During April 2008, the highest density (3,125 specimens per m^2) of the Asiatic clam (*Corbicula spp*.) was observed in the immediate vicinity of the station discharge (Location #2). *Corbicula spp.* was not observed at any of the three (3) reference locations.

August 2008: During August 2008, the highest density (1,693 specimens per m^2) of the Asiatic clam (*Corbicula spp*.) was also observed in the immediate vicinity of the station discharge (Location #2). *Corbicula spp.* was observed at one (1) reference location (Location #22).

The distribution of *Corbicula* was similar for both sampling periods.

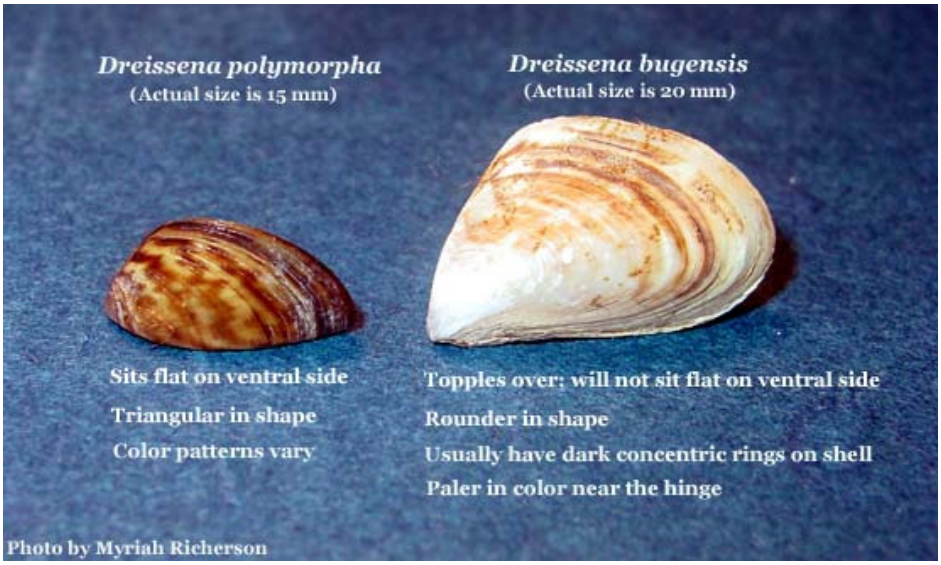
Figure 8. Asiatic Freshwater Clam (*Corbicula fluminea*)

Dreissena spp. Zebra Mussels (*Dreissena polymorpha,* Figure 9) invaded the Great Lakes in 1986 and are considered to be a nuisance species, because of their rapid population growth and their strong byssal attachment to a variety of man-made and natural surfaces. The quagga mussel (*Dreissena bugenis,* Figure 9) is a close relative to the zebra mussel.

April 2008: During April 2008, the highest dressinid density (352 specimens per m^2) was observed at a reference site (Location #21).

August 2008: *Dreissena* densities during August 2008, were substantially higher than observed in April, 2008. During August 2008, the highest dressinid density (2,734 specimens per m^2) was also observed at a reference site (Location #21).

Figure 9. Zebra and Quagga Mussels (*Dreissena spp.*)

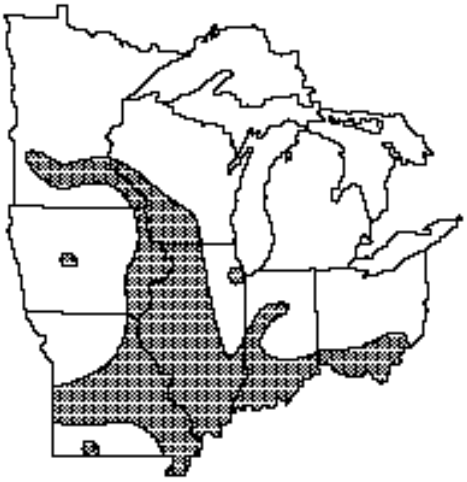


Unionid Species: Three unionid species were observed in the vicinity of the station discharge including fawnsfoot (*Trucilla donaciformis*), three-ridge (*Amblema plicata plicata)* and pink heelsplitter (*Potamilus alatus*). Fawnsfoot (Figure 6) typically inhabits large rivers or the lower reaches of medium sized streams in sand or gravel. It is widespread and common throughout most of its range (Figure 10), however, it is identified as a threatened species in Ohio.[1]

Figure 10. Fawnsfoot (*Trucilla donaciformis)*

[1] http://www.dnr.state.oh.us/wildlife/Home/resources/mgtplans/threatened/tabid/6006/Default.aspx

Figure 11. Range of Fawnsfoot (*Trucilla donaciformis)*



April 2008: During April 2008, the highest unionid density (17 specimens per m^2) was observed at Location #5. Unionid species were not observed at any of the reference locations. Fawnsfoot (*Trucilla donaciformis)* was collected in the immediate vicinity of the station discharge at Locations 1, 5 and 6.

August 2008: During August 2008, the highest unionid densities (13 specimens per m^2) were observed at Locations #2 and #3. Unionid species were not observed at any of the reference locations. Fawnsfoot (*Trucilla donaciformis)* was collected in the immediate vicinity of the station discharge at Locations #2 and #5.

3.2 *Lyngbya wollei / Plectonema*

Collection of the mat-forming filamentous cyanobacterium *Lyngbya wollei* was a major focus for this study. This new invasive algae multiplies rapidly in warm water and is very resistant to freezing and cold weather. *L. wollei* is known to produce a potent, acutely lethal toxin with signs of poisoning that are similar to those of paralytic shellfish poisoning (Carmichael et al, 1997). It was first observed in Maumee Bay in the fall of 2006. This species differs from other algal species in that it grows in the sediments.

3.2.1 Sampling Procedure

April 2008: To sample for *Lyngbya*, a petite Ponar (15 cm x 15 cm) was used to obtain four (4) replicate samples of the undisturbed surface sediments. Some difficulties were experienced when sampling for *Lyngbya*. At Location #1, the substrate was very hard and it was difficult to obtain representative samples. At this site only one sample could be collected. At Location #17, a representative sample could not be collected due to strong winds at the time of sampling. At Reference Site #22, the sediment was comprised of very compact sand and it was not possible to sample with a petite Ponar. A standard Ponar (9 inches x 9 inches) was used to collect a sample at this site. However, a core sample could not be obtained with the standard Ponar. For this location, the entire sample was used for analysis.

While *Plectonema* could be observed in the Ponar samples, it tended to aggregate in the corners of the sampler (because of reduced turbulence in these areas as the sample was

retrieved from the bottom of the lake). Because the corer fits only into the middle region of the Ponar sampler, this sampling approach may not provide an accurate estimate of the quantity of *Plectonema* present.

August 2008: For fall sampling, core samples were not taken from within the petite Ponar. The entire sample was retrieved, placed on ice and returned to the lab. The entire sample (sediment and water) was then passed through a 250-micron mesh filter. The retained material (sediment, shells and *Lyngbya*) was preserved in 3% gluteraldehyde. This approach is expected to provide a more reliable estimate of algal biovolume.

3.2.2 Procedure to Estimate Biovolume

Samples were analyzed by Drs. Jeffrey Miner and Rex Lowe (Bowling Green State University) as well as an international cyanobacteria specialist Dr. Tom Bridgemean (University of Toledo). The samples were identified as *Plectonema*, a freshwater cyanobacterium that is very similar to *Lyngbya*.

A compound microscope was used to estimate the biovolume of each *Plectonema* cell (0.0000268 cubic millimeters) and the average length of each cell (12.04 microns). A dissecting scope was then used to count the total number and length of *Lyngbya* filaments in each sample. The total biovolume of *Plectonema* per sample was estimated based on total filament length and the estimated number of cells per sample, but is more of an estimate of presence/absence rather than a quantitative assessment.

3.2.3 Plectonema Biovolume

Detailed summaries of algal specimens collected for each sample are presented in Appendices 5-6. Mean densities of *Plectonema* are presented in Table 3 and Figure 12.

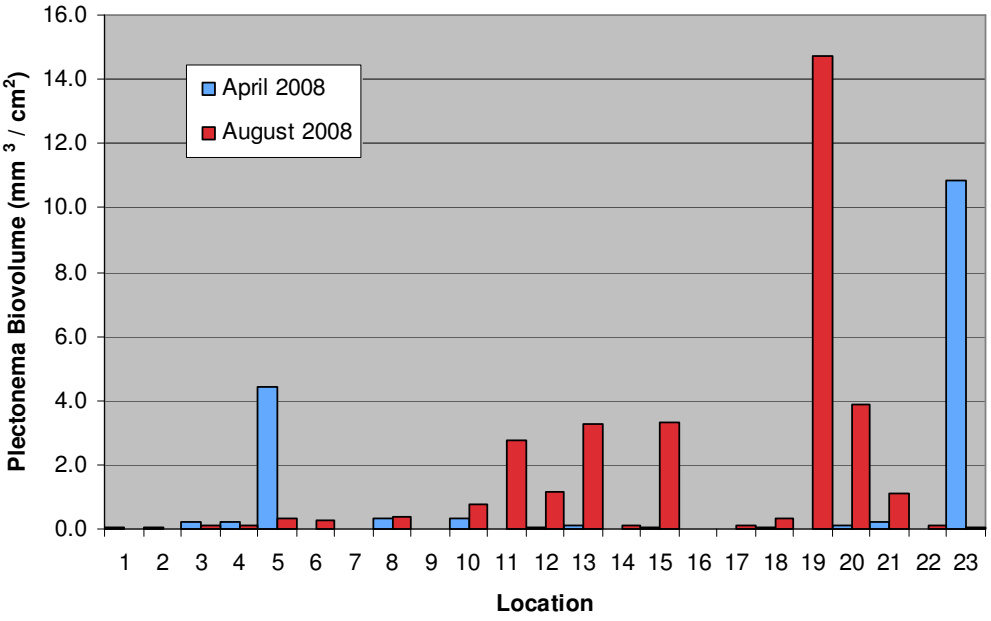
April 2008: A maximum biovolume of 289,269 mm^3/cm^2 was observed at Location #16.

August 2008: A maximum biovolume of 15 mm^3/cm^2 was observed at Location #19.

Table 3. Plectonema Biovolume (Presence / Absence)

Location	Plectonema Biovolume (mm^3/cm^2)	
	April 2008	August 2008
1	0.077	0.003
2	0.029	0.005
3	0.223	0.090
4	0.219	0.134
5	4.443	0.311
6	0.021	0.281
7	0.000	0.021
8	0.316	0.360
9	19,943	0.106
10	0.316	0.763
11	0.017	2.746
12	0.067	1.138
13	0.135	3.253
14	0.000	0.088
15	0.036	3.314
16	289,168	0.581
17	NA	0.124
18	0.044	0.341
19	0.000	14.727
20	0.120	3.889
21	0.209	1.092
22	0.001	0.094
23	10.833	0.046

Figure 12. Plectonema Biovolume: April versus August, 2008



Note: Figure excludes April 2008 estimates for Locations #9 (19,943 mm^3/cm^2) and #16 (289,168 mm^3/cm^2).

3.3 *Oligochaetes and Chironomids*

A detailed summary oligochaetes and chironomids collected for each sample are presented in Appendix 7 (April, 2008). Data for the August-September 2008 sampling program is not yet complete. Mean densities of oligochaetes and chironomids are presented in Table 4 and Figures 13-14. A peak oligochaete density of 11,090 specimens per m^2 was observed in the immediate vicinity of the plant discharge (Location #2). A peak chironimid density of 817 specimens per m^2 was observed at Location #14.

Table 4. Oligochaete and Chironomid Abundance

Location	Whole-Oligochaete	Pieces-Oligochaete	Chironomids	Other
1	151	0	129	75
2	11,090	8,872	110	0
3	7,878	6,807	182	129
4	416	511	48	0
5	6,654	7,533	110	0
6	2,859	736	158	0
7	1,305	454	24	0
8	2,333	1,759	440	0
9	2,715	1,759	554	53
10	784	899	143	100
11	1,635	397	301	210
12	4,034	1,955	339	14
13	5,660	2,409	569	0
14	6,080	3,403	817	115
15	2,873	727	158	0
16	884	392	229	0
17	3,786	2,180	124	0
18	1,950	755	263	0
19	468	841	124	0
20	727	167	120	0
21	9,407	3,824	43	0
22	822	545	48	29
23	942	263	186	29

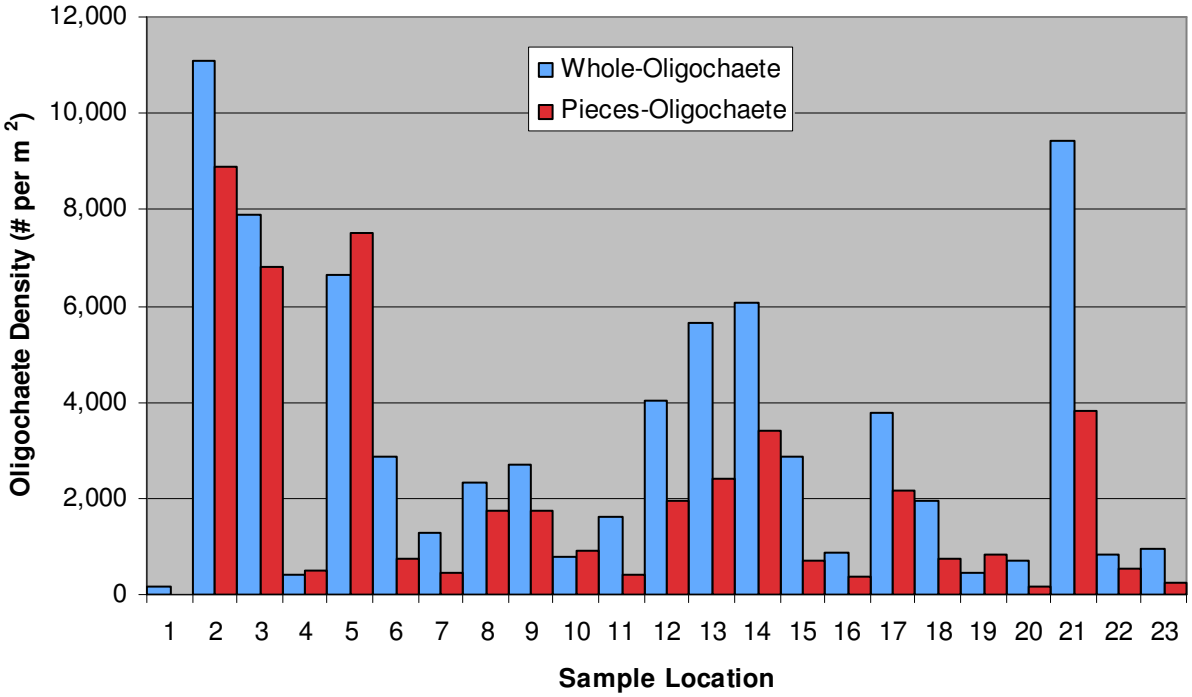


Figure 13. Oligochaete Abundance

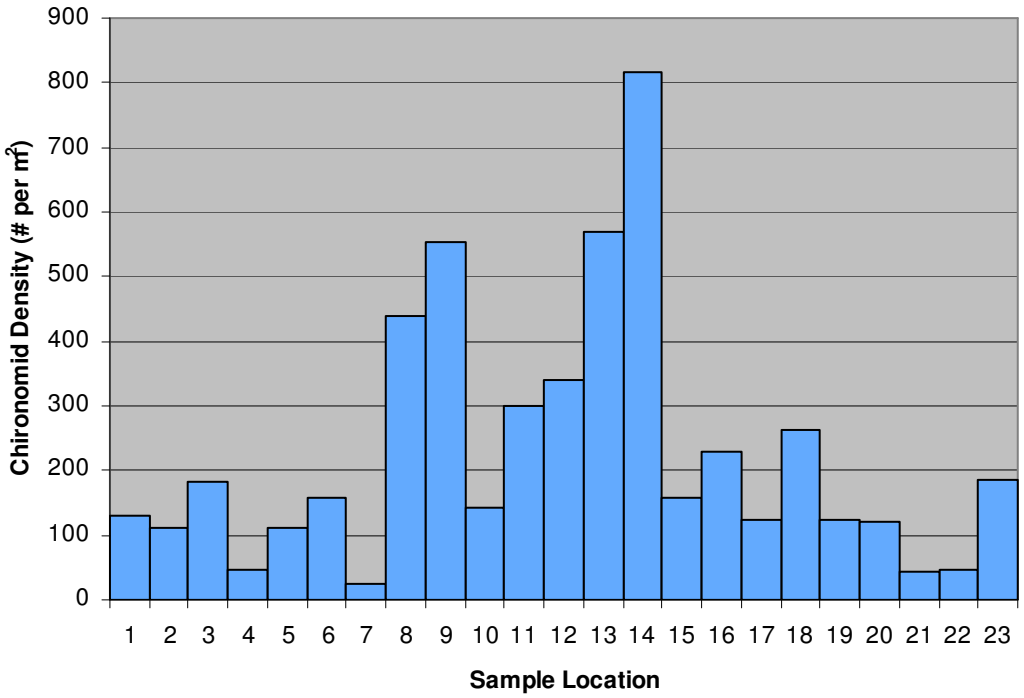


Figure 14. Chironomid Abundance

4.0 PRELIMINARY CONCLUSIONS

For the 2008 field study, sampling was conducted in April and August 2008. Key results are outlined below.

- Collection of the mat-forming filamentous cyanobacterium *Lyngbya wollei* was a major focus for this study. This new invasive algae multiplies rapidly in warm water and is very resistant to freezing and cold weather. Algal samples were analyzed by Drs. Jeffrey Miner and Rex Lowe (Bowling Green State University) as well as an international cyanobacteria specialist Dr. Tom Bridgemean (University of Toledo). The samples were identified as *Plectonema*, a freshwater cyanobacterium that is very similar to *Lyngbya*. This species was observed at most sites including the reference sites.

- The Asiatic freshwater clam (*Corbicula fluminea*) is established in most of the major rivers in the United States. In the northern midwest (including the Great Lakes), it is typically confined to heated discharges because it cannot survive water temperatures less than 2.0^{o}C. During April 2008, the highest density (3,125 specimens per m^{2}) of the Asiatic clam (*Corbicula spp.*) was observed at Location #2. During August 2008, the highest density (1,693 specimens per m^{2}) of the Asiatic clam (*Corbicula spp.*) was also observed at Location #2.

- Three unionid species were observed in the vicinity of the station discharge including fawnsfoot (*Trucilla donaciformis*), three-ridge (*Amblema plicata plicata)* and pink heelsplitter (*Potamilus alatus*). During April 2008, the highest unionid density (17 specimens per m^{2}) was observed at Location #5. During August 2008, the highest unionid densities (13 specimens per m^{2}) were observed at Locations #2 and #3. Unionid species were not observed at any of the reference locations.

- Fawnsfoot (*Trucilla donaciformis)* was collected in the immediate vicinity of the station discharge at locations 1, 5 and 6 (April 2008) and locations 2 and 5 (August 2008). This species typically inhabits large rivers or the lower reaches of medium sized streams in sand or gravel. It is widespread and common throughout most of its range; however, it is identified as a threatened species in Ohio.

- For April 2008, a peak oligochaete density of 11,090 specimens per m^{2} was observed in the immediate vicinity of the plant discharge (Location #2). A peak chironimid density of 817 specimens per m^{2} was observed at Location #14.

5.0 REFERENCES

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Appendix 1. Physical Data (April, 2008)

Location	Date	Time	Wind Dir	Wind Velocity (mph)	Water depth (m)	Turbidity (NTU)	Water Temp (°C)	Secchi Depth (m)	pH	Conductivity (mS/cm)	DO (mg/L)
1	30-Apr-08	1700	N	25	1.5	19.8	22.1	NA	8.4	625	10.4
2	30-Apr-08	1345	N	15	NA	22.8	21.4	0.3	8.4	624	8.8
3	30-Apr-08	1400	N	20	1.0	28.1	18.4	0.3	8.4	616	8.5
4	30-Apr-08	1500	N	20	1.0	19.8	18.4	0.3	8.4	615	9.3
5	22-Apr-08	1400	NE	15	2.0	14.4	22.7	0.3	NA	596	8.2
6	30-Apr-08	1240	N	15	1.2	21	19.2	0.3	8.2	620	8.8
7	22-Apr-08	1600	NE	15	1.0	15.9	20.4	0.3	7.1	594	8.2
8	30-Apr-08	1500	N	20	NA	30.6	18.0	0.4	8.4	596	8.6
9	30-Apr-08	1200	NW	10	1.6	10.5	18.4	0.2	8.3	605	8.3
10	30-Apr-08	1130	SE	10	1.3	12.8	17.5	0.2	8.2	613	8.7
11	25-Apr-08	1153	SE	15	2.5	30.8	16.4	0.3	8.1	382	9.4
12	25-Apr-08	1040	SE	15	2.0	17.1	18.3	0.4	8.0	562	7.8
13	30-Apr-08	1045	SE	5	1.5	19.2	16.0	0.2	8.2	614	8.2
14	25-Apr-08	0945	SE	15	2.0	17.8	15.6	0.3	7.8	458	9.1
15	27-Apr-08	1500	W	5	2.3	34	17.4	1.2	8.0	548	7.9
16	30-Apr-08	1000	calm	calm	2.0	25.7	15.3	0.2	8.4	614	8.5
17	24-Apr-08	0845	NE	20	8.0	6.9	15.7	0.8	7.1	528	8.1
18	27-Apr-08	1250	SW	10	3.3	10.1	15.6	0.3	8.1	489	8.5
19	27-Apr-08	1330	W	10	2.9	12.2	15.6	NA	8.0	480	8.4
20	27-Apr-08	1417	W	10	2.0	10.7	15.6	0.3	8.0	442	8.6
R1	27-Apr-08	0920	SW	10	3.0	9.4	14.6	0.6	8.3	521	8.7
R2	27-Apr-08	1030	SW	10	3.0	5.4	15.0	0.5	8.3	521	8.9
R3	27-Apr-08	1145	SW	10	3.1	1.7	15.0	0.9	8.1	419	8.9

Appendix 2. Physical Data (August-September, 2008)

Location	Date	Time	Wind Dir	Wind Velocity (mph)	Water depth (m)	Turbidity (NTU)	Water Temp (°C)	Secchi Depth (m)	pH	Conductivity (mS/cm)	DO (mg/L)
1	7-Sep-08	1330	SW	5	2.0	22.4	29.0	NA	8.3	425	6.2
2	7-Sep-08	1057	SW	10	0.3	23.7	27.9	0.2	8.1	379	9.3
3	7-Sep-08	1129	SW	10	0.6	25.3	25.7	0.2	7.9	375	6.4
4	7-Sep-08	1157	SW	5	0.3	50.6	26.1	0.3	8.9	364	8.3
5	7-Sep-08	0944	SW	10	1.0	8.9	25.3	0.2	7.1	359	5.9
6	7-Sep-08	1012	SW	10	1.0	27.9	24.9	0.2	7.3	378	5.9
7	7-Sep-08	1035	SW	10	0.3	22.7	23.7	0.2	8.8	363	8.9
8	29-Aug-08	1555	W	10	1.5	18.7	27.7	0.4	7.6	391	6.0
9	3-Sep-08	1438	E	10	1.0	8.9	31.3	0.2	8.3	419	5.8
10	3-Sep-08	1511	E	10	1.0	77.9	31.0	0.3	8.8	419	7.4
11	3-Sep-08	0953	calm	0	2.1	9.6	26.6	0.2	8.1	335	6.7
12	3-Sep-08	1022	calm	0	NA	8.8	28.9	0.3	8.5	425	5.8
13	3-Sep-08	1312	E	5	1.0	11.7	30.1	0.3	8.7	419	6.7
14	29-Aug-08	1000	NA	NA	2.3	7.2	23.9	0.4	7.5	360	7.7
15	29-Aug-08	1400	N	5	2.3	18.0	24.5	0.4	8.4	309	7.4
16	3-Sep-08	1232	E	NA	1.6	13.4	29.7	0.3	8.8	412	6.7
17	3-Sep-08	0909	calm	calm	2.3	13.0	22.9	0.4	8.4	335	7.7
18	29-Aug-08	1145	SE	10	3.0	24.6	23.9	0.3	7.1	273	8.1
19	29-Aug-08	1230	N	5	2.6	62.1	23.4	0.3	7.5	270	7.8
20	29-Aug-08	1317	N	10	1.6	11.1	23.9	0.5	8.4	285	8.9
R1	24-Aug-08	1130	NW	5	2.7	5.6	26.2	0.6	8.4	334	7.4
R2	24-Aug-08	1300	E	5	NA	10.6	26.3	0.6	9.0	289	9.7
R3	24-Aug-08	1100	calm	5	3.0	3.8	24.1	0.7	8.5	275	7.5

Appendix 3. Mussel Abundance (April, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species ID
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
1	1	4	4	0	69.4	69.4	0.0	
1	2	4	7	0	69.4	121.5	0.0	
1	3	1	9	1	17.4	156.3	17.4	*Trucilla donaciformis (*Fawnsfoot*)*
1	4	3	5	0	52.1	86.8	0.0	
1	**Total**	**12**	**25**	**1**	**52.1**	**108.5**	**4.3**	
2	1	192	2	0	3333.3	34.7	0.0	
2	2	193	1	0	3350.7	17.4	0.0	
2	3	129	0	2	2239.6	0.0	34.7	*Amblema plicata plicata (*Three ridge*)*
2	4	206	0	0	3576.4	0.0	0.0	
2	**Total**	**720**	**3**	**2**	**3125.0**	**13.0**	**8.7**	
3	1	20	1	1	347.2	17.4	17.4	*Amblema plicata plicata (*Three ridge)
3	2	15	1	0	260.4	17.4	0.0	
3	3	14	0	0	243.1	0.0	0.0	
3	4	16	3	1	277.8	52.1	17.4	*Amblema plicata plicata (*Three ridge*)*
3	**Total**	**65**	**5**	**2**	**282.1**	**21.7**	**8.7**	
4	1	0	0	0	0.0	0.0	0.0	
4	2	0	0	0	0.0	0.0	0.0	
4	3	0	0	0	0.0	0.0	0.0	
4	4	0	0	0	0.0	0.0	0.0	
4	**Total**	**0**	**0**	**0**	**0**	**0**	**0**	
5	1	14	0	1	243.1	0.0	17.4	*Trucilla donaciformis (*Fawnsfoot*)*
5	2	16	0	1	277.8	0.0	17.4	*Trucilla donaciformis (*Fawnsfoot*)*
5	3	10	0	0	173.6	0.0	0.0	
5	4	12	0	2	208.3	0.0	34.7	*Trucilla donaciformis* (Fawnsfoot) and
5	**Total**	**52**	**0**	**4**	**225.7**	**0.0**	**17.4**	*Potamilus alatus* (Pink heelsplitter).

Appendix 3 (Cont'd). Mussel Abundance (April, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species ID
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
6	1	7	0	0	121.5	0.0	0.0	
6	2	13	0	0	225.7	0.0	0.0	
6	3	6	1	0	104.2	17.4	0.0	
6	4	11	1	1	191.0	17.4	17.4	*Trucilla donaciformis (*Fawnsfoot*)*
6	**Total**	**37**	**2**	**1**	**160.6**	**8.7**	**4.3**	
7	1	2	0	0	34.7	0.0	0.0	
7	2	1	0	0	17.4	0.0	0.0	
7	3	3	1	0	52.1	17.4	0.0	
7	4	2	0	0	34.7	0.0	0.0	
7	**Total**	**8**	**1**	**0**	**34.7**	**4.3**	**0.0**	
8	1	11	0	0	191.0	0.0	0.0	
8	2	8	0	0	138.9	0.0	0.0	
8	3	13	0	0	225.7	0.0	0.0	
8	4	7	0	0	121.5	0.0	0.0	
8	**Total**	**39**	**0**	**0**	**169.3**	**0.0**	**0.0**	
9	1	11	0	0	191.0	0.0	0.0	
9	2	18	1	0	312.5	17.4	0.0	
9	3	15	0	0	260.4	0.0	0.0	
9	4	12	0	0	208.3	0.0	0.0	
9	**Total**	**56**	**1**	**0**	**243.1**	**4.3**	**0.0**	
10	1	7	1	0	121.5	17.4	0.0	
10	2	1	0	0	17.4	0.0	0.0	
10	3	5	1	0	86.8	17.4	0.0	
10	4	2	0	0	34.7	0.0	0.0	
10	**Total**	**15**	**2**	**0**	**65.1**	**8.7**	**0.0**	

Appendix 3 (Cont'd). Mussel Abundance (April, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species ID
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
11	1	0	5	0	0.0	86.8	0.0	
11	2	0	5	0	0.0	86.8	0.0	
11	3	0	3	0	0.0	52.1	0.0	
11	4	0	2	0	0.0	34.7	0.0	
11	**Total**	**0**	**15**	**0**	**0.0**	**65.1**	**0.0**	
12	1	0	13	0	0.0	225.7	0.0	
12	2	0	9	0	0.0	156.3	0.0	
12	3	0	9	0	0.0	156.3	0.0	
12	4	0	11	0	0.0	191.0	0.0	
12	**Total**	**0**	**42**	**0**	**0.0**	**182.3**	**0.0**	
13	1	23	16	1	399.3	277.8	17.4	*Amblema plicata plicata (*Three ridge)
13	2	10	8	0	173.6	138.9	0.0	
13	3	37	6	0	642.4	104.2	0.0	
13	4	21	9	0	364.6	156.3	0.0	
13	**Total**	**91**	**39**	**1**	**395.0**	**169.3**	**4.3**	
14	1	0	0	0	0.0	0.0	0.0	
14	2	0	0	0	0.0	0.0	0.0	
14	3	0	2	0	0.0	34.7	0.0	
14	4	0	3	0	0.0	52.1	0.0	
14	**Total**	**0**	**5**	**0**	**0.0**	**21.7**	**0.0**	
15	1	0	0	0	0.0	0.0	0.0	
15	2	0	19	0	0.0	329.9	0.0	
15	3	0	18	0	0.0	312.5	0.0	
15	4	0	6	0	0.0	104.2	0.0	
15	**Total**	**0**	**43**	**0**	**0.0**	**186.6**	**0.0**	

Appendix 3 (Cont'd). Mussel Abundance (April, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species ID
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
16	1	0	1	0	0.0	17.4	0.0	
16	2	0	0	0	0.0	0.0	0.0	
16	3	0	0	0	0.0	0.0	0.0	
16	4	0	4	0	0.0	69.4	0.0	
16	**Total**	**0**	**5**	**0**	**0.0**	**21.7**	**0.0**	
17	1	0	0	0	0.0	0.0	0.0	
17	2	0	0	0	0.0	0.0	0.0	
17	3	0	0	0	0.0	0.0	0.0	
17	4	0	0	0	0.0	0.0	0.0	
17	**Total**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	
18	1	0	1	0	0.0	17.4	0.0	
18	2	0	17	0	0.0	295.1	0.0	
18	3	0	4	0	0.0	69.4	0.0	
18	4	0	14	0	0.0	243.1	0.0	
18	**Total**	**0**	**36**	**0**	**0.0**	**156.3**	**0.0**	
19	1	0	0	0	0.0	0.0	0.0	
19	2	0	0	0	0.0	0.0	0.0	
19	3	0	0	0	0.0	0.0	0.0	
19	4	0	0	0	0.0	0.0	0.0	
19	**Total**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	
20	1	0	15	0	0.0	260.4	0.0	
20	2	0	0	0	0.0	0.0	0.0	
20	3	0	5	0	0.0	86.8	0.0	
20	4	0	4	0	0.0	69.4	0.0	
20	**Total**	**0**	**24**	**0**	**0.0**	**104.2**	**0.0**	

Appendix 3 (Cont'd). Mussel Abundance (April, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species ID
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
21	1	0	2	0	0.0	34.7	0.0	
21	2	0	79	0	0.0	1371.5	0.0	
21	3	0	0	0	0.0	0.0	0.0	
21	4	0	0	0	0.0	0.0	0.0	
21	**Total**	**0**	**81**	**0**	**0.0**	**351.6**	**0.0**	
22	1	0	2	0	0.0	34.7	0.0	
22	2	0	5	0	0.0	86.8	0.0	
22	3	0	0	0	0.0	0.0	0.0	
22	4	0	12	0	0.0	208.3	0.0	
22	**Total**	**0**	**19**	**0**	**0.0**	**82.5**	**0.0**	
23	1	0	0	0	0.0	0.0	0.0	
23	2	0	45	0	0.0	781.3	0.0	
23	3	0	0	0	0.0	0.0	0.0	
23	4	0	0	0	0.0	0.0	0.0	
23	**Total**	**0**	**45**	**0**	**0.0**	**195.3**	**0.0**	

Appendix 4. Mussel Abundance (August-September, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
1	1	0	0	0	0.0	0.0	0.0	
1	2	0	0	0	0.0	0.0	0.0	
1	3	0	0	0	0.0	0.0	0.0	
1	4	0	0	0	0.0	0.0	0.0	
1	**Total**	**0**	**0**	**0**	**0.0**	**0.0**	**0.0**	
2	1	107	0	2	1,857.6	0.0	34.7	Amblema plicata plicata (Three ridge) and Trucilla donaciformis (Fawn's foot)
2	2	92	0	1	1,597.2	0.0	17.4	Amblema plicata plicata (Three ridge)
2	3	83	0	0	1,441.0	0.0	0.0	
2	4	108	0	0	1,875.0	0.0	0.0	
2	**Total**	**390**	**0**	**3**	**1,692.7**	**0.0**	**13.0**	
3	1	9	3	0	156.3	52.1	0.0	
3	2	10	3	1	173.6	52.1	17.4	Amblema plicata plicata (Three ridge)
3	3	5	2	2	86.8	34.7	34.7	Amblema plicata plicata (Three ridge) and Potamilus alatus (Pink Heelsplitter)
3	4	18	3	0	312.5	52.1	0.0	
3	**Total**	**42**	**11**	**3**	**182.3**	**47.7**	**13.0**	
4	1	7	38	1	121.5	659.7	17.4	Amblema plicata plicata (Three ridge)
4	2	10	21	0	173.6	364.6	0.0	
4	3	11	26	0	191.0	451.4	0.0	
4	4	4	9	0	69.4	156.3	0.0	
4	**Total**	**32**	**94**	**1**	**138.9**	**408.0**	**4.3**	
5	1	3	0	0	52.1	0.0	0.0	
5	2	6	0	0	104.2	0.0	0.0	
5	3	8	0	0	138.9	0.0	0.0	
5	4	0	0	1	0.0	0.0	17.4	Trucilla donaciformis (Fawn's foot)
5	**Total**	**17**	**0**	**1**	**73.8**	**0.0**	**4.3**	

Appendix 4 (Cont'd). Mussel Abundance (August-September, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
6	1	11	1	0	191.0	17.4	0.0	
6	2	6	0	0	104.2	0.0	0.0	
6	3	10	0	0	173.6	0.0	0.0	
6	4	5	0	0	86.8	0.0	0.0	
6	**Total**	**32**	**1**	**0**	**138.9**	**4.3**	**0.0**	
7	1	39	4	0	677.1	69.4	0.0	
7	2	17	0	0	295.1	0.0	0.0	
7	3	13	2	0	225.7	34.7	0.0	
7	4	22	1	0	381.9	17.4	0.0	
7	**Total**	**91**	**7**	**0**	**395.0**	**30.4**	**0.0**	
8	1	8	0	0	138.9	0.0	0.0	
8	2	2	0	0	34.7	0.0	0.0	
8	3	2	2	0	34.7	34.7	0.0	
8	4	9	0	0	156.3	0.0	0.0	
8	**Total**	**21**	**2**	**0**	**91.1**	**8.7**	**0.0**	
9	1	9	0	0	156.3	0.0	0.0	
9	2	11	0	1	191.0	0.0	17.4	Amblema plicata plicata (Three ridge)
9	3	3	1	0	52.1	17.4	0.0	
9	4	11	0	0	191.0	0.0	0.0	
9	**Total**	**34**	**1**	**1**	**147.6**	**4.3**	**4.3**	
10	1	21	4	0	364.6	69.4	0.0	
10	2	21	2	0	364.6	34.7	0.0	
10	3	32	2	0	555.6	34.7	0.0	
10	4	12	4	0	208.3	69.4	0.0	
10	**Total**	**86**	**12**	**0**	**373.3**	**52.1**	**0.0**	

Appendix 4 (Cont'd). Mussel Abundance (August-September, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
11	1	13	54	0	225.7	937.5	0.0	
11	2	18	63	0	312.5	1,093.8	0.0	
11	3	8	49	0	138.9	850.7	0.0	
11	4	6	60	0	104.2	1,041.7	0.0	
11	**Total**	**45**	**226**	**0**	**195.3**	**980.9**	**0.0**	
12	1	2	40	0	34.7	694.4	0.0	
12	2	0	77	0	0.0	1,336.8	0.0	
12	3	0	57	0	0.0	989.6	0.0	
12	4	0	40	0	0.0	694.4	0.0	
12	**Total**	**2**	**214**	**0**	**8.7**	**928.8**	**0.0**	
13	1	9	11	0	156.3	191.0	0.0	
13	2	7	13	0	121.5	225.7	0.0	
13	3	12	10	0	208.3	173.6	0.0	
13	4	8	49	0	138.9	850.7	0.0	
13	**Total**	**36**	**83**	**0**	**156.3**	**360.2**	**0.0**	
14	1	0	79	0	0.0	1,371.5	0.0	
14	2	0	12	0	0.0	208.3	0.0	
14	3	0	18	0	0.0	312.5	0.0	
14	4	0	39	0	0.0	677.1	0.0	
14	**Total**	**0**	**148**	**0**	**0.0**	**642.4**	**0.0**	
15	1	0	89	0	0.0	1,545.1	0.0	
15	2	0	285	0	0.0	4,947.9	0.0	
15	3	0	79	0	0.0	1,371.5	0.0	
15	4	0	4	0	0.0	69.4	0.0	
15	**Total**	**0**	**457**	**0**	**0.0**	**1,983.5**	**0.0**	

Appendix 4 (Cont'd). Mussel Abundance (August-September, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
16	1	26	4	0	451.4	69.4	0.0	
16	2	31	9	0	538.2	156.3	0.0	
16	3	12	0	0	208.3	0.0	0.0	
16	4	32	2	0	555.6	34.7	0.0	
16	**Total**	**101**	**15**	**0**	**438.4**	**65.1**	**0.0**	
17	1	1	21	0	17.4	364.6	0.0	
17	2	0	16	0	0.0	277.8	0.0	
17	3	0	23	0	0.0	399.3	0.0	
17	4	0	15	0	0.0	260.4	0.0	
17	**Total**	**1**	**75**	**0**	**4.3**	**325.5**	**0.0**	
18	1	0	63	0	0.0	1,093.8	0.0	
18	2	0	217	0	0.0	3,767.4	0.0	
18	3	0	112	0	0.0	1,944.4	0.0	
18	4	0	88	0	0.0	1,527.8	0.0	
18	**Total**	**0**	**480**	**0**	**0.0**	**2,083.3**	**0.0**	
19	1	0	3	0	0.0	52.1	0.0	
19	2	0	58	0	0.0	1,006.9	0.0	
19	3	0	89	0	0.0	1,545.1	0.0	
19	4	0	111	0	0.0	1,927.1	0.0	
19	**Total**	**0**	**261**	**0**	**0.0**	**1,132.8**	**0.0**	
20	1	0	178	0	0.0	3,090.3	0.0	
20	2	0	161	0	0.0	2,795.1	0.0	
20	3	0	148	0	0.0	2,569.4	0.0	
20	4	0	66	0	0.0	1,145.8	0.0	
20	**Total**	**0**	**553**	**0**	**0.0**	**2,400.2**	**0.0**	

Appendix 4 (Cont'd). Mussel Abundance (August-September, 2008)

Sample ID		Number Collected			Density (Specimens per m^2)			Unionid Species
Location	Rep	Corbicula	Dressinid	Unionid	Corbicula	Dressinid	Unionid	
21	1	0	314	0	0.0	5,451.4	0.0	
21	2	0	142	0	0.0	2,465.3	0.0	
21	3	0	77	0	0.0	1,336.8	0.0	
21	4	0	97	0	0.0	1,684.0	0.0	
21	**Total**	**0**	**630**	**0**	**0.0**	**2,734.4**	**0.0**	
22	1	0	0	0	0.0	0.0	0.0	
22	2	0	3	0	0.0	52.1	0.0	
22	3	0	0	0	0.0	0.0	0.0	
22	4	1	2	0	17.4	34.7	0.0	
22	**Total**	**1**	**5**	**0**	**4.3**	**21.7**	**0.0**	
23	1	0	1	0	0.0	17.4	0.0	
23	2	0	14	0	0.0	243.1	0.0	
23	3	0	6	0	0.0	104.2	0.0	
23	4	0	0	0	0.0	0.0	0.0	
23	**Total**	**0**	**21**	**0**	**0.0**	**91.1**	**0.0**	

Appendix 5. Algae Abundance (April, 2008)

Sample ID	Area (cm^2)	Plectonema count (DS)	Mean Plectonema size (cm)	Tot Length (cm) All filaments	Cells/sample	Biovolume (mm^3)	Plectonema BV (mm^3/cm^2)	Dominant Spp.	Notes, additional spp.
1-1	232.26	64	1.25	80.0	664,000	17.79520	0.07662	Fragillaria	bivalves
2-1	6.60	1	2	2	16,600	0.44488	0.06741	Fragillaria	Gyrosigma, bivalves
2-2	6.60	0	0	0	0	0.00000	0.00000	Nematode	Annelid, bivalves
2-3	6.60	1	0.5	0.5	4,150	0.11122	0.01685	Gyrosigma	Fragillaria, bivalves
2-4	6.60	2	0.5	1	8,300	0.22244	0.03370	Aulacoseira	bivalves
3-1	6.60	9	1.5	13.5	112,050	3.00294	0.45499	Synedra	
3-2	6.60	6	1.25	7.5	62,250	1.66830	0.25277	Synedra	
3-3	6.60	3	1.5	4.5	37,350	1.00098	0.15166	Synedra	
3-4	6.60	1	1	1	8,300	0.22244	0.03370	Navicula	
4-1	6.60	2	0.75	1.5	12,450	0.33366	0.05055	Navicula	Synedra
4-2	6.60	14	1.75	24.5	203,350	5.44978	0.82572	Navicula	Fragillaria
4-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Navicula
4-4	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Synedra
5-1	6.60	5	0.4	2	16,600	0.44488	0.067385641	Fragillaria	
5-2	6.60	5	0.9	4.5	37,350	1.00098	0.151617692	Fragillaria	
5-3	6.60	2	0.25	0.5	4,150	0.11122	0.01684641	Fragillaria	
5-4	6.60	34	1.5	520.48	4,319,984	115.7755712	17.53643914	Fragillaria	Plecto clump
6-1	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Synedra
6-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	sparse
6-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	sparse
6-4	6.60	2	1.25	2.5	20,750	0.55610	0.08426	Fragillaria	sparse
7-1	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
7-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Amorpha
7-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
7-4	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Nematode
8-1	6.60	10	1.75	17.5	145,250	3.89270	0.58980	Nematode	sparse
8-2	6.60	4	0.5	2	16,600	0.44488	0.06741	Nematode	sparse
8-3	6.60	9	2	18	149,400	4.00392	0.60665	Aulacoseira	Navicula
8-4	6.60	0	0	0	0	0.00000	0.00000	Gyrosigma	Cymatopleura
9-1	6.60	2	1.75	3.5	29,050	0.77854	0.11796	Fragillaria	
9-2	6.60	1	0.5	0.5	4,150	0.11122	0.01685	Fragillaria	
9-3	6.60	large clump	1cm3	2366864	19,644,971,200	526485.22816	79770.48912	Fragillaria	
9-4	6.60	2	2	4	33,200	0.88976	0.13481	Fragillaria	
10-1	6.60	9	1.5	13.5	112,050	3.00294	0.45499	Synedra	Fragillaria
10-2	6.60	2	1	2	16,600	0.44488	0.06741	Fragillaria	
10-3	6.60	2	1	2	16,600	0.44488	0.06741	Synedra	Aulacoseira
10-4	6.60	10	2	20	166,000	4.44880	0.67406	Synedra	Aulacoseira

Appendix 5 (Cont'd). Algae Abundance (April, 2008)

Sample ID	Area (cm^2)	Plectonema count (DS)	Mean Plectonema size (cm)	Tot Length (cm) All filaments	Cells/Sample	Biovolume (mm^3)	Plectonema BV (mm^3/cm^2)	Dominant Spp.	Notes, additional spp.
11-1	6.60	1	1	1	8,300	0.22244	0.03370	Fragillaria	sparse
11-2	6.60	0	0	0	0	0.00000	0.00000	Nematode	Fragillaria
11-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	sparse
11-4	6.60	1	1	1	8,300	0.22244	0.03370	Desmid	sparse
12-1	6.60	0	0	0	0	0.00000	0.00000	Gyrosigma	Fragillaria
12-2	6.60	2	1	2	16,600	0.44488	0.06741	Gyrosigma	Fragillaria
12-3	6.60	2	1.5	3	24,900	0.66732	0.10111	Nematode	Gyrosigma
12-4	6.60	2	1.5	3	24,900	0.66732	0.10111	Fragillaria	Gyrosigma
13-1	6.60	8	1.5	12	99,600	2.66928	0.40444	Fragillaria	Amorpha
13-2	6.60	1	1	1	8,300	0.22244	0.03370	Fragillaria	
13-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
13-4	6.60	4	0.75	3	24,900	0.66732	0.10111	Fragillaria	
14-1	6.60	0	0	0	0	0.00000	0.00000	Synedra	Fragillaria
14-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Cymatopleura
14-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Synedra
14-4	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Synedra
15-1	6.60	1	0.5	0.5	4,150	0.11122	0.01685	Fragillaria	
15-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
15-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
15-4	6.60	3	1.25	3.75	31,125	0.83415	0.12639	Nematode	
16-1	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
16-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
16-3	6.60	0	0	0	0	0.00000	0.00000	Nematode	
16-4	6.60	2 large clumps	7 cm3, 7.5 cm3	34319526	284,852,065,800	7634035.36344	1156672.02476	Fragillaria	
17-1	Too windy to collect sample								
17-2	Too windy to collect sample								
17-3	Too windy to collect sample								
17-4	Too windy to collect sample								
18-1	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
18-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Gyrosigma
18-3	6.60	3	0.5	1.5	12,450	0.33366	0.05055	Fragillaria	Nematode
18-4	6.60	5	0.75	3.75	31,125	0.83415	0.12639	Fragillaria	sparse
19-1	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
19-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
19-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
19-4	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	
20-1	6.60	6	2	12	99,600	2.66928	0.40444	Fragillaria	Gyrosigma
20-2	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Nematode
20-3	6.60	0	0	0	0	0.00000	0.00000	Fragillaria	Nematode
20-4	6.60	3	0.75	2.25	18,675	0.50049	0.07583	Fragillaria	

Appendix 5 (Cont'd). Algae Abundance (April, 2008)

Sample ID	Area (cm^2)	Plectonema count (DS)	Mean Plectonema size (cm)	Tot Length (cm) All filaments	Cells/Sample	Biovolume (mm^3)	Plectonema BV (mm^3/cm^2)	Dominant Spp.	Notes, additional spp.
R1-1	6.60	3	0.75	2.25	18,675	0.50049	0.07583	Fragillaria	sparse
R1-2	6.60	8	1.25	10	83,000	2.22440	0.33703	Fragillaria	Gyrosigma
R1-3	6.60	1	0.5	0.5	4,150	0.11122	0.01685	Fragillaria	Gyrosigma
R1-4	6.60	8	1.5	12	99,600	2.66928	0.40444	Fragillaria	Gyrosigma
R2-1	523.00	4	0.5	2	16,600	0.44488	0.00085	Fragillaria	Merismopedia
R2-2	523.00	5	0.5	2.5	20,750	0.55610	0.00106	Fragillaria	Merismopedia
R2-3	523.00	0	0	0	0	0.00000	0.00000	Fragillaria	Merismopedia
R2-4	523.00	3	1	3	24,900	0.66732	0.00128	Fragillaria	
R3-1	6.60	308	1.25	385	3,195,500	85.63940	12.97567	Plectonema	Fragillaria
R3-2	6.60	231	1.25	288.75	2,396,625	64.22955	9.73175	Fragillaria	Plectonema
R3-3	6.60	168	1.5	252	2,091,600	56.05488	8.49316	Fragillaria	Plectonema
R3-4	6.60	240	1.5	360	2,988,000	80.07840	12.13309	Plectonema	Fragillaria

Appendix 6. Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
1-1	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
1-2	1	0				
	2	0				
	3	0				
	4	0				sponges present
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
1-3	1	0				
	2	0				
	3	0				
	4	0				
	5	0				sponges present
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
1-4	1	0				
	2	0				
	3	1	1290			sponges present
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
2-1	1	0				
	2	0				
	3	1	150			
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
2-2	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
2-3	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
2-4	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
3-1	1	0				
	2	0				
	3	0				
	4	1	410			
	5	0				
	6	0				
	7	0				
	8	1				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
3-2	1	0			1	
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0			1	
	8	1	300			
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
3-3	1	0				
	2	0				
	3	0				
	4	1	1070			
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
3-4	1	0				
	2	1	1460			
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
4-1	1	1	790			
	2	0				
	3	0				
	4	0				
	5	1	1630			
	6	0				
	7	0				
	8	1	300			
	9	0				
	10	1	600			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
4-2	1	0				
	2	1	250			
	3	0			1	
	4	0				
	5	0				
	6	1	300			
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
4-3	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
4-4	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	1	250		1	
	8	0				
	9	0				
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
5-1	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0			1	
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
5-2	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
5-3	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
5-4	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	1	1080			
	7	0				
	8	0				
	9	0				
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
6-1	1	0				
	2	0			1	
	3	0			1	
	4	0				
	5	0			1	
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
6-2	1	0				
	2	1	300			
	2	1	1050			
	3	0			1	
	4	0				
	5	0				
	6	1	1200		1	
	7	0				
	8	0			1	
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
6-3	1	1	606			
	2	0				
	3	0				
	4	0				
	5	1	738			
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
6-4	1	0			1	
	2	0				
	2	0				
	3	0				
	4	0				
	5	0			1	
	6	0				
	7	0				
	8	0				
	9	0			1	
	10	0			1	

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
7-1	1	0				
	2	0				
	3	0				
	4	1	310	2		
	5	0		2		
	6	0		4		
	7	0				
	8	0				
	9	0		1		
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
7-2	1	0		2		
2nd sample	2	0				
label	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	
7-2	1	0		2		
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0				
	8	0				
	9	0				
	10	0				
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	Clad cells
7-3	1	0				
	2	0		1		4
	3	0				
	4	0				
	5	0		1		
	6	0				
	7	0				
	8	0				
	9	1	260			
	10	1	500			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*	Clad cells
7-4	1	0				
	2	0				
	3	0				
	4	0				
	5	0				
	6	0				
	7	0		1		
	8	0				
	9	1	200			
	10	0				

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
8-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			1
	8	0			
	9	0			
	10	1	250		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
8-2	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
8-3	1	0			
	2	1	1620		
	3	0			
	4	0			
	5	0			
	6	1	560		
	7	1	70		
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
8-4	1	0			
	2	0			
	3	0			
	4	0			
	5	0			1
	6	0			
	7	0			
	8	0			
	9	0			
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
9-1	1	1	180		
	2	0			1
	3	0			1
	4	0			1
	5	0			2
	6	0			
	7	0			
	8	0			
	9	0			1
	10	0			1
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
9-2	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
9-3	1	1	330		
	2	0			1
	3	0			1
	4	0			1
	5	0			2
	6	1	70		
	7	0			
	8	1	1200		
	9	0			1
	10	0			1
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
9-4	1	0			1
	2	0			
	3	0			2
	4	1	300		
	5	0			1
	6	0			
	7	1	300		1
	8	0			1
	9	0			2
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
10-1	1	0			
	2	1	400		
	3	1	230		
	4	0			
	5	0			1
	6	0			
	7	1	40		
	8	0			
	9	0			
	10	0			2
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
10-2	1	0			
	2	1	400		
	3	1	230		
	4	0			
	5	0			1
	6	0			
	7	1	40		
	8	0			
	9	0			
	10	0			2
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
10-3	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	1	740		
	7	0			
	8	0			1
	9	0			
	10	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
10-4	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	0			
	10	1	2200		
	10	1	1200		
	10	1	800		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
11-1	1	0			
	2	1	150		
	3	0			
	4	0			
	5	0			
	6	0			
	7	1	1320		1
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
11-12	1	1	414		
	2	1	299		
	2	1	724		
	2	1	626		
	2	1	585		
	2	1	1199		
	2	1	1151		
	2	1	320		
	3	0			
	4	1	86		
	5	0			
	6	1	158		
	6	1	154		
	7	1	448		
	7	1	886		
	7	1	396		
	7	1	600		
	8	0	886		
	9	1	219		
	10	0	600		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
11-3	1	1	420		
	1	1	570		
	1	1	190		
	2	1	110		
	2	1	450		
	3	1	690		
	3	1	120		
	3	1	100		
	4	1	100		
	4	1	150		
	5	1	960		
	5	1	950		
	6	1	100		
	6	1	520		
	7	1	880		
	7	1	220		
	7	1	1080		
	8	1	880		
	8	1	430		
	9	1	840		
	9	1	150		
	9	1	1000		
	10	1	390		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
11-4	1	1	180		
	1	1	490		
	2	1	600		
	2	1	410		
	3	0			
	4	0			
	5	1	620		
	5	1	1430		
	6	0			
	7	1	1390		
	7	1	200		
	7	1	250		
	7	1	480		
	7	1	1470		
	8	1	1300		
	8	1	240		
	9	1	1000		
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
12-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	1	890		
	7	0			
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
12-2	1	0			1
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	0			
	10	1	370		2
	10	1	800		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
12-3	1	1	220		
	1	1	480		
	1	1	1250		
	1	1	250		
	2	1	50		
	3	0			
	4	0			1
	5	1	250		
	5	1	1770		
	6	1	540		
	6	1	260		
	6	1	70		
	7	0			
	8	0			
	9	1	1850		
	9	1	110		
	9	1	150		
	9	1	300		
	9	1	450		
	10	1	850		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
12-4	1	1	240		
	1	1	140		
	2	1	150		
	2	1	190		
	2	1	150		
	2	1	250		
	2	1	520		
	2	1	570		
	3	1	850	5	1
	3	1	250		
	3	1	630		
	4	1	170	2	1
	5	1	510		1
	6	1	700	1	1
	6	1	780		
	6	1	700		
	6	1	630		
	6	1	240		
	7	1	560		
	8	1	80		
	8	1	930		
	8	1	580		
	8	1	860		
	8	1	200		
	9	0			
	10	1	100		
	10	1	100		
	10	1	1070		
	10	1	700		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
13-1	1	1	240		
	1	1	140		
	2	1	150		
	2	1	190		
	2	1	150		
	2	1	250		
	2	1	520		
	2	1	570		
	3	1	850	5	1
	3	1	250		
	3	1	630		
	4	1	170	2	1
	5	1	510		1
	6	1	700	1	1
	6	1	780		
	6	1	700		
	6	1	630		
	6	1	240		
	7	1	510		1
	8	1	700	1	1
	8	1	780		
	8	1	700		
	8	1	630		
	8	1	240		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
13-2	1	1	600		
	1	1	110		
	1	1	750		
	1	1	130		
	1	1	180		
	1	1	120		
	1	1	1300		
	2	1	850		
	2	1	300		
	2	1	250		
	3	1	70		
	3	1	580		
	4	1	230		
	4	1	440		
	4	1	380		
	5	1	140		
	5	1	850		
	5	1	270		
	6	1	1050		
	6	1	450		
	6	1	600		
	6	1	1100		
	6	1	200		
	6	1	200		
	7	1	1140		
	7	1	340		
	8	1	300		
	8	1	500		
	8	1	60		
	9	1	300		
	9	1	2200		
	9	1	550		
	9	1	1550		
	9	1	1460		
	9	1	320		
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
13-3	1	1	100		
	2	0			
	3	0			
	4	0			
	5	1	660		
	5	1	520		
	6	1	310		
	6	1	650		
	7	1	400		
	7	1	700		
	7	1	700		
	7	1	800		
	7	1	2200		
	7	1	610		
	7	1	890		
	7	1	420		
	7	1	680		
	7	1	710		
	7	1	800		
	7	1	2300		
	7	1	590		
	7	1	860		
	8	1	980		
	8	1	320		
	9	1	450		
	9	1	410		
	10	1	580		
	10	1	840		
	10	1	610		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
13-4	1	1	280		
	1	1	190		
	2	1	200		
	3	1	380		
	3	1	270		
	4	1	480		
	5	1	60		
	6	1	450		
	7	1	100		
	8	1	350		
	9	1	200		
	10	1	630		
	10	1	1250		
	10	1	900		
	10	1	540		
	10	1	240		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
14-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	1	0	620		
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
14-2	1	0			
	2	0			
	3	1	170		
	4	1	200		
	4	1	140		
	5	0			
	6	0			
	7	1	380		
	8	1	600		
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
14-3	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	1	300		
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
14-4	1	0			
	2	0			
	3	0			
	4	1	310	2	
	5	0		2	
	6	0		3	
	7	0			
	8	0			
	9	0		1	
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
15-1	1	1	550		
	1	1	180		
	2	1	230		
	3	1	230		
	4	0			
	5	0			
	6	1	690	1	1
	7	0			1
	8	1	400		
	9	1	180		
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
15-2	1	1	590		
	2	1	1050		
	2	1	390		
	3	1	80		
	3	1	170		
	3	1	60		
	3	1	90		
	4	0			
	5	1	510		
	6	1	230		
	6	1	990		
	6	1	1680		
	6	1	590		
	6	1	820		
	7	1	530		
	7	1	1200		
	8	1	600		
	9	1	120		
	9	1	470		
	9	1	510		
	9	1	640		
	9	1	1100		
	10	1	2000		
	10	1	2200		
	10	1	600		
	10	1	440		
	10	1	700		
	10	1	650		
	10	1	1200		
	10	0	450		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
15-3	1	0			
	2	0			
	3	1	1380		
	4	0			
	5	0			
	6	1	590		
	6	1	750		
	7	1	450		
	7	1	470		
	7	1	660		
	7	1	730		
	8	1	1200		
	8	1	680		
	8	1	2200		
	8	1	1100		
	9	1	640		
	9	1	1130		
	10	1	300		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
15-4	1	1	150		
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	1	90		
	10	1	1060		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
16-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	1	1180		
	8	1	2100		
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
16-2	1	0			
	2	1	670		
	2	1	200		
	2	1	550		
	3	1	330		
	4	0		1	
	5	1	600		
	6	0		2	
	7	1	1100	1	
	7	1	1040		
	7	1	920	1	1
	8	0			
	9	0			
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
16-3	1	0			
	2	1	370		
	2	1	180	1	
	3	1	230		
	4	1	1050	2	
	4	1	980		
	5	1	200	3	
	5	1	1300		
	5	1	140		
	5	1	200		
	6	1	1000	3	
	7	0			
	7	1	730		
	8	1	870		
	8	1	40		
	9	1	200		
	9	1	880		
	10	1	1200		
	10	1	1400		
	10	1	800		
	10	1	200		
	10	1	1500		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
16-4	1	0		2	
	2	1	60		
	3	1	340	1	
	4	1	340		
	5	0		1	
	6	0			
	7	0			
	8	0			
	9	1	210		
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
17-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			1
	9	1		1320	1
	10	1		1200	1
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
17-2	1	0			
	2	0			
	3	0			
	4	0			1
	5	1	300		5
	6	0			
	7	0			
	8	0			
	9	0			
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
17-3	1	0			
	2	0			
	3	0			
	4	0			
	5	1	392		
	5	1	793		
	6	0			
	7	1	238		
	7	1	925		
	7	1	879		
	7	1	1046		
	7	1	409		
	8	0			
	9	0			
	10	1	541		
	10	1	1051		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
17-4	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	0			
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
18-1	1	0			
	2	0			
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	0			
	9	1	270		
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
18-2	1	1	450		
	1	1	280		
	2	1	570		
	3	0			
	4	0			
	5	0			
	6	0			
	7	0			
	8	1	190		
	8	1	680		
	9	0			
	10	0			

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
18-3	1	0			
	2	0			
	3	1	250		
	4	0			
	5	1	450		
	6	0			
	7	1	1000		
	8	0			
	9	0			
	10	0			
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
18-4	1	1	459		
	2	1	755		
	3	1	827		
	3	1	41		
	4	1	536		
	5	1	630		
	6	1	406		
	6	1	283		
	6	1	782		
	6	1	566		
	6	1	230		
	7	1	33		
	7	1	274		
	7	1	433		
	8	1	1191		
	8	1	455		
	9	0			
	10	1	456		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
19-1	1	0			
	2	1	930		
	3	0			
	4	1	1180		
	4	1	670		
	5	1	1380		
	6	0			
	7	1	300		
	7	1	860		
	7	1	1770		
	7	1	800		
	8	1	920		
	9	1	1400		
	9	1	950		
	10	1	920		
	10	1	500		
	10	1	170		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
19-2	1	1	680		
	1	1	400		
	1	1	320		
	1	1	50		
	1	1	480		
	1	1	640		
	1	1	350		
	1	1	450		
	2	1	2250		
	2	1	420		
	2	1	800		
	2	1	1800		
	2	1	1470		
	2	1	450		
	3	1	400		
	3	1	400		
	3	1	250		
	3	1	500		
	3	1	480		
	3	1	200		
	4	1	180		
	4	1	370		
	4	1	80		
	5	1	1000		
	6	1	1000		
	6	1	600		
	6	1	150		
	7	1	300		
	7	1	400		
	7	1	410		
	7	1	250		
	8	1	200		
	8	1	300		
	8	1	250		
	9	1	1150		
	9	1	100		
	10	1	100		
	10	1	120		
	10	1	1440		
	10	1	590		
	10	1	490		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira	Micrcoleus*
19-3	1	1	900		
	1	1	150		
	1	1	470		
	1	1	470		
	2	1	150		
	2	1	600		
	2	1	170		
	2	1	300		
	3	1	1800		
	3	1	100		
	3	1	200		
	3	1	170		
	3	1	100		
	4	1	1270		
	4	1	120		
	4	1	420		
	5	1	620		
	5	1	520		
	5	1	210		
	5	1	350		
	6	1	130		
	6	1	860		
	6	1	280		
	6	1	190		
	7	1	680		
	7	1	100		
	7	1	600		
	7	1	1170		
	8	1	1200		
	8	1	900		
	8	1	710		
	8	1	140		
	8	1	450		
	8	1	900		
	8	1	890		
	9	1	130		
	9	1	500		
	9	1	700		
	9	1	1090		
	9	1	320		
	9	1	740		
	9	1	230		
	9	1	520		
	9	1	370		
	9	1	150		
	10	1	860		
	10	1	670		
	10	1	630		
	10	1	400		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
20-1	1	1	1730	1
	2	1	150	
	3	1	1900	1
	3	1	240	
	4	1	720	
	5	0		4
	6	0		
	7	1	250	7
	7	1	300	
	8	1	560	5
	8	1	370	
	9	1	970	1
	10	1	450	2
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
20-2	1	0		
	2	0		
	3	1	959	
	4	1	249	
	4	1	487	
	5	1	490	
	6	0		
	7	1	703	
	7	1	126	
	8	1	551	
	9	0		
	10	1	471	

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
20-3	1	0		
	2	1	350	
	2	1	450	
	3	1	270	
	4	1	380	
	4	1	890	
	4	1	310	
	5	1	110	
	5	1	270	
	5	1	80	
	6	1	1010	2
	6	1	290	
	7	1	280	
	7	1	360	
	7	1	170	
	8	1	610	
	9	1	1130	2
	9	1	300	
	10	1	1170	3
	10	1	90	
	10	1	400	
	10	1	200	
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
20-4	1	1	140	3
	1	1	630	
	2	0		1
	3	1	240	5
	4	0		1
	5	0		4
	6	1	1230	3
	7	1	50	5
	8	1	1110	3
	9	1	1880	5
	10	1	1420	8
	10	1	460	

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
21-1	1	1	110	
	2	1	40	
	3	1	1130	
	3	1	870	
	3	1	920	
	3	1	580	
	3	1	920	
	3	1	530	
	4	1	230	
	4	1	120	
	5	1	1180	
	5	1	1290	
	6	0		
	7	1	80	
	7	1	480	
	8	1	480	
	8	1	250	
	9	1	840	
	10	1	40	
	10	1	1630	
	10	1	1220	
	10	1	290	
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
21-2	1	0		
	2	0		
	3	0		
	4	0		
	5	1	1079	
	6	1	857	
	7	0		
	8	0		
	9	1	39	
	10	0		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
21-3	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	1	1100	
	8	1	700	
	9	1	1290	
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
21-4	1	0		
	2	0		
	3	0		
	4	1	540	
	5	1	230	
	6	1	180	
	7	1	1310	
	7	1	1200	
	7	1	1140	
	7	1	310	
	8	0	180	
	9	1	320	
	9	1	590	
	10	1	1230	
	10	1	1700	

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
22-1	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	0		
	9	0		
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
22-2	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	0		
	9	1	110	
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
22-3	1	1	1090	
	2	1	130	
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	0		
	9	0		
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
22-4	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	0		
	9	1	520	
	10	0		

Appendix 6 (Cont'd). Algae Abundance (August-September, 2008)

SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
23-1	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	0		
	7	0		
	8	0		
	9	0		
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
23-2	1	0		
	2	0		
	3	0		
	4	0		
	5	0		
	6	1	1650	
	7	0		
	8	0		
	9	0		
	10	0		
SAMPLE	FIELDS	Lyngbya	length µm	Pleurosira
23-4	1	0		
	2	1	430	
	2	1	300	
	3	0		
	4	0		
	5	0		
	6	1		
	7	0		
	8	0		
	9	0		
	10	1	450	

Appendix 7. Oligochaete and Chironomid Abundance (April, 2008)

Spring 2008 Location-Rep	Gear	Gear Area(m^2)	Proportion Sample Processed				Numbers Counted				Density (# per m^2)			
			Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other
1-1	PetitePonar	0.0232	1	1	1	1	7	0	6	0	302	0	259	0
1-2	PetitePonar	0.0232	1	1	1	1	2	0	5	1	86	0	216	43
1-3	PetitePonar	0.0232	1	1	1	1	4	0	0	6	172	0	0	259
1-4	PetitePonar	0.0232	1	1	1	1	1	0	1	0	43	0	43	0
2-1	StPonar	0.0523	0.0625	0.0625	1	1	49	32	8		14,990	9,790	153	0
2-2	StPonar	0.0523	0.0625	0.0625	1	1	26	12	3		7,954	3,671	57	0
2-3	StPonar	0.0523	0.0625	0.0625	1	1	37	27	5		11,319	8,260	96	0
2-4	StPonar	0.0523	0.0625	0.0625	1	1	33	45	7		10,096	13,767	134	0
3-1	StPonar	0.0523	0.0625	0.0625	1	1	24	28	13		7,342	8,566	249	0
3-2	StPonar	0.0523	0.0625	0.0625	1	1	36	19	11		11,013	5,813	210	0
3-3	StPonar	0.0523	0.0625	0.0625	1	1	28	26	7	27	8,566	7,954	134	516
3-4	StPonar	0.0523	0.0625	0.0625	1	1	15	16	7		4,589	4,895	134	0
4-1	StPonar	0.0523	1	1	1	1	9	7	5		172	134	96	0
4-2	StPonar	0.0523	1	1	1	1	27	26	2		516	497	38	0
4-3	StPonar	0.0523	1	1	1	1	27	31	3		516	593	57	0
4-4	StPonar	0.0523	1	1	1	1	24	43	0		459	822	0	0
5-1	StPonar	0.0523	0.0625	0.0625	1	1	16	24	5		4,895	7,342	96	0
5-2	StPonar	0.0523	0.0625	0.0625	1	1	25	15	5		7,648	4,589	96	0
5-3	StPonar	0.0523	0.0625	0.0625	1	1	32	42	6		9,790	12,849	115	0
5-4	StPonar	0.0523	0.125	0.125	1	1	28	35	7		4,283	5,354	134	0
6-1	StPonar	0.0523	0.5	0.5	1	1	70	25	15		2,677	956	287	0
6-2	StPonar	0.0523	0.5	0.5	1	1	53	12	7		2,027	459	134	0
6-3	StPonar	0.0523	0.5	0.5	1	1	74	21	4		2,830	803	76	0
6-4	StPonar	0.0523	0.5	0.5	1	1	102	19	7		3,901	727	134	0
7-1	StPonar	0.0523	1	1	1	1	34	9	0		650	172	0	0
7-2	StPonar	0.0523	1	1	1	1	38	9	1		727	172	19	0
7-3	StPonar	0.0523	1	1	1	1	83	45	1		1,587	860	19	0
7-4	StPonar	0.0523	1	1	1	1	118	32	3		2,256	612	57	0
8-1	StPonar	0.0523	0.25	0.25	1	1	24	22	33		1,836	1,683	631	0
8-2	StPonar	0.0523	0.125	0.125	1	1	24	8	17		3,671	1,224	325	0
8-3	StPonar	0.0523	0.125	0.125	1	1	13	15	24		1,989	2,294	459	0
8-4	StPonar	0.0523	0.125	0.125	1	1	12	12	18		1,836	1,836	344	0
9-1	StPonar	0.0523	0.25	0.25	0.25	1	28	32	10	4	2,141	2,447	765	76
9-2	StPonar	0.0523	0.25	0.25	0.5	1	31	17	12	4	2,371	1,300	459	76
9-3	StPonar	0.0523	0.25	0.25	0.5	1	40	23	10	3	3,059	1,759	382	57
9-4	StPonar	0.0523	0.25	0.25	0.5	1	43	20	16		3,289	1,530	612	0
10-1	StPonar	0.0523	0.25	0.25	1	1	11	19	10	9	841	1,453	191	172
10-2	StPonar	0.0523	0.25	0.25	1	1	13	9	8	3	994	688	153	57
10-3	StPonar	0.0523	0.25	0.25	1	1	14	8	2	4	1,071	612	38	76
10-4	StPonar	0.0523	0.5	0.5	1	1	6	22	10	5	229	841	191	96

Appendix 7 (Cont'd). Oligochaete and Chironomid Abundance (April, 2008)

Spring 2008 Location-Rep	Gear	Gear Area(m^2)	Proportion Sample Processed				Numbers Counted				Density (# per m^2)			
			Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other
11-1	StPonar	0.0523	1	1	1	1	107	12	19		2,046	229	363	0
11-2	StPonar	0.0523	1	1	1	1	83	11	14	7	1,587	210	268	134
11-3	StPonar	0.0523	1	1	1	1	57	42	11	37	1,090	803	210	707
11-4	StPonar	0.0523	1	1	1	1	95	18	19		1,816	344	363	0
12-1	StPonar	0.0523	1	1	1	1	128	89	14	3	2,447	1,702	268	57
12-2	StPonar	0.0523	0.125	0.125	1	1	41	17	27		6,272	2,600	516	0
12-3	StPonar	0.0523	0.25	0.25	1	1	56	23	24		4,283	1,759	459	0
12-4	StPonar	0.0523	0.25	0.25	0.5	0.5	41	23	3		3,136	1,759	115	0
13-1	StPonar	0.0523	0.125	0.125	1	1	67	29	33		10,249	4,436	631	0
13-2	StPonar	0.0523	0.125	0.125	1	1	27	16	20		4,130	2,447	382	0
13-3	StPonar	0.0523	0.125	0.125	1	1	16	5	37		2,447	765	707	0
13-4	StPonar	0.0523	0.125	0.125	1	1	38	13	29		5,813	1,989	554	0
14-1	StPonar	0.0523	0.125	0.125	1	1	36	17	33		5,507	2,600	631	0
14-2	StPonar	0.0523	0.125	0.125	0.5	1	56	15	25	6	8,566	2,294	956	115
14-3	StPonar	0.0523	0.125	0.125	0.5	1	47	26	25	7	7,189	3,977	956	134
14-4	StPonar	0.0523	0.125	0.125	0.5	1	20	31	19	11	3,059	4,742	727	210
15-1	StPonar	0.0523	0.5	0.5	1	1	85	14	6		3,250	535	115	0
15-2	StPonar	0.0523	0.5	0.5	1	1	60	12	10		2,294	459	191	0
15-3	StPonar	0.0523	0.25	0.25	1	1	54	17	11		4,130	1,300	210	0
15-4	StPonar	0.0523	1	1	1	1	95	32	6		1,816	612	115	0
16-1	StPonar	0.0523	1	1	1	1	33	30	6		631	574	115	0
16-2	StPonar	0.0523	1	1	1	1	50	16	33		956	306	631	0
16-3	StPonar	0.0523	1	1	1	1	57	29	3		1,090	554	57	0
16-4	StPonar	0.0523	1	1	1	1	45	7	6		860	134	115	0
17-1	StPonar	0.0523	0.125	0.125	1	1	14	10	8		2,141	1,530	153	0
17-2	StPonar	0.0523	0.0625	0.0625	1	1	25	15	6		7,648	4,589	115	0
17-3	StPonar	0.0523	0.125	0.125	1	1	17	8	6		2,600	1,224	115	0
17-4	StPonar	0.0523	0.125	0.125	1	1	18	9	6		2,753	1,377	115	0
18-1	StPonar	0.0523	1	1	1	1	81	50	15		1,549	956	287	0
18-2	StPonar	0.0523	1	1	1	1	52	26	11		994	497	210	0
18-3	StPonar	0.0523	1	1	1	1	105	38	10		2,008	727	191	0
18-4	StPonar	0.0523	1	1	1	1	170	44	19		3,250	841	363	0
19-1	StPonar	0.0523	1	1	1	1	20	11	3		382	210	57	0
19-2	StPonar	0.0523	1	1	1	1	32	64	6		612	1,224	115	0
19-3	StPonar	0.0523	1	1	1	1	24	69	10		459	1,319	191	0
19-4	StPonar	0.0523	1	1	1	1	22	32	7		421	612	134	0
20-1	StPonar	0.0523	1	1	1	1	9	7	6		172	134	115	0
20-2	StPonar	0.0523	1	1	1	1	19	6	10		363	115	191	0
20-3	StPonar	0.0523	1	1	1	1	9	0	2		172	0	38	0
20-4	StPonar	0.0523	1	1	1	1	115	22	7		2,199	421	134	0

Appendix 7 (Cont'd). Oligochaete and Chironomid Abundance (April, 2008)

Spring 2008 Location-Rep	Gear	Gear Area(m^2)	Proportion Sample Processed				Numbers Counted				Density (# per m^2)			
			Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other	Whole-Oligo	Pieces-Oligo	Chiron-omids	Other
R1-1(21)	StPonar	0.0523	0.0625	0.0625	1	1	26	29	4		7,954	8,872	76	0
R1-2(21)	StPonar	0.0523	0.0625	0.0625	1	1	48	6	2		14,685	1,836	38	0
R1-3(21)	StPonar	0.0523	0.0625	0.0625	1	1	27	8	2		8,260	2,447	38	0
R1-4(21)	StPonar	0.0523	0.0625	0.0625	1	1	22	7	1		6,730	2,141	19	0
R2-1(22)	StPonar	0.0523	1	1	1	1	33	10	3	6	631	191	57	115
R2-2(22)	StPonar	0.0523	1	1	1	1	27	22	3		516	421	57	0
R2-3(22)	StPonar	0.0523	1	1	1	1	33	28	2		631	535	38	0
R2-4(22)	StPonar	0.0523	1	1	1	1	79	54	2		1,511	1,033	38	0
R3-1(23)	StPonar	0.0523	1	1	1	1	52	22	1		994	421	19	0
R3-2(23)	StPonar	0.0523	1	1	1	1	59	17	26		1,128	325	497	0
R3-3(23)	StPonar	0.0523	1	1	1	1	18	8	5	6	344	153	96	115
R3-4(23)	StPonar	0.0523	1	1	1	1	68	8	7		1,300	153	134	0