

# **Benthic Evaluation of the Magnetawan River Upstream and Downstream of the Ontario Graphite Ltd. Site**



**For: Kearney Watershed Environmental Foundation**

**2019/11/08**

**Project: 2019-001**

**Fieldwebster Environmental Consulting**





# **Benthic Evaluation of the Magnetawan River Upstream and Downstream of the Ontario Graphite Ltd. Site**

**Project: 2019-001**

Stan Walker, President  
Kearney Watershed Environmental Foundation

2019/11/08

Dear Stan Walker

Fieldwebster Environmental Consulting has prepared a report on the 2019 benthic evaluation of the Magnetawan River upstream and downstream of the Ontario Graphite Ltd. site located at 2142 Forestry Tower Rd, Kearney, ON ('the Site'). The benthic evaluation was designed to determine if the discharges from the Site have impacted the benthic community of the Magnetawan River downstream from the site. Impacts to the benthic community can be inferred as affecting the rest of the river's ecology. The sampling and analysis followed the Ontario Benthic Biomonitoring Network (OBBN) standards as regulated by the Ontario Ministry of the Environment. To account for seasonal variation, samples were taken on May 19<sup>th</sup> 2019, July 26<sup>th</sup> 2019 & September 14<sup>nd</sup> 2019. This study included the collection and identification over 2500 specimens from the Magnetawan River. The data collected indicates that the Magnetawan River downstream of the Site could be negatively impacted by wastewater discharges from the Site. Should you have any further questions regarding this please feel free to contact Fieldwebster Environmental Consulting.

Sincerely,

Valerie Fieldwebster B.A.H. OBBN  
(705) 783-1772  
340 Fish Lake Rd.  
Box 92  
Huntsville, ON.  
POA 1R0

Jesse Fieldwebster M.Eng. OBBN  
(705) 956-0386  
295 Fourth St.  
Midland, ON.  
L4R 3T9



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## **1.0 Introduction**

Ontario Graphite Ltd currently owns a dormant graphite mine (the Site) near the town of Kearney. The Site is located at 2142 Forestry Tower Road, Kearney just under 6 km west of Algonquin Park. The Site was closed in 1994 and has remained dormant since. In 2013 there was a recent attempt to reopen the mine however these efforts have stalled and the mine and ancillary facilities remain in a dormant state. The Site has had a number of issues with wastewater discharges outside of its approved discharge standards (Environmental Registry of Ontario: 013-4794, 013-2969, 013-1823). See Appendix D for wastewater discharge data. To help assess what effects the discharge water from the Site have been having on the Magnetawan River, Kearney Watershed Environmental Foundation (KWEF) contracted Fieldwebster Environmental Consulting to provide a baseline benthic evaluation of the Magnetawan River.

## **2.0 OBBN Sampling**

OBBN sampling uses the collection of benthic aquatic invertebrates to monitor the ecological condition of lakes, streams, and wetlands. The network is led by the Ontario Ministry of Environment, certifying technicians to carry out site by site analysis. The network features standard sampling protocols, training, and a database (which allows data to be shared among members). Benthic invertebrates are invertebrates which live in the water or bottoms of creeks, streams or lakes. The quality of a body of water can be assessed by the diversity and dominance of specific populations of benthic invertebrates.

## **3.0 Sampling Sites**

Three benthic studies in two separate sites were completed during the 2019 study season. One site (the Study Site) was located downstream of expected discharges from the Site. A second site (the Control) was located upstream of the Site. The control site was also located upstream of sites which the KWEF reported anomalous water testing results. This was done to ensure a control site that was free from potentially confounding factors. To adequately characterise the benthic community of each site as per OBBN standards, three subsample partial transects were chosen at both the study site and the control site.

All 6 of the sampling locations had very soft, silty bottoms with organic muck with no rock and some woody debris. The all sites had some submergent vegetation and a very small percentage narrow leaf emergents. No broad leafed emergent, robust emergent or free floating plants were observed. The shores of each site were dominated by grasses and sedges with a small percentage of woody shrubs. This similarity should allow comparison between both the control and study sites. See Appendix A and for further details concerning sampling locations.

The sites were accessed from Forestry Tower Road.





## 4.0 Methodology

The sampling and analysis followed the Ontario Benthic Biomonitoring Network (OBBN) standards as regulated by the Ontario Ministry of the Environment. To account for seasonal variation samples were taken in Spring 19/05/2019, Summer 26/07/2019, Autumn 14/09/2019. During each sampling date, three subsamples were taken from both the study and control sites. Each subsample was comprised of a minimum of 100 organisms. Over the course of the investigation more than 2500 benthic invertebrates were caught, identified, and included in the analysis.

Often, OBBN investigations use a reference condition approach (RCA) where an impacted test site is compared to an unimpacted site (the reference site) with comparable features but not necessarily on the same water body. While the RCA functions well, it can be vulnerable to small site by site variations and water body specific events. This investigation will use a comparable reference site upstream of the source of potential impact (the Site). This approach can compensate better for any water body specific events and is viewed as preferable when possible.

Sampling sites were reached by foot. Samples were collected using the kick and sweep technique with a 500 micro dip net. Sampling transects started at the river's edge and proceeded inwards until reaching ~1m in depth. Net contents were deposited into holding bucket. Live identification technique was done in field using a Marchant Box and aided with a variety of magnifying optics. Identification took roughly one to two hours per subsample with two OBBN staff.

Water samples were taken from both the study site and the control. Water samples were stored at 2-6 °C and analysed within 24hrs. Analysis was done using a DR890 Hach Colorimeter with Hach reagents. QA/QC included one duplicate per sampling session, field blanks and comparisons to known standards. See Appendix B for further details.

## 5.0 Resulting Study

This study is designed to determine if the benthic ecosystem on the Magnetawan River directly downstream from the Site has been impacted by the wastewater discharges from the Site. Impacts to the benthic ecosystem by extension can indicate further ecosystem impacts<sup>1</sup>. Data will be published by the Ontario Benthos Biomonitoring Network (OBBN).

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<sup>1</sup> Covich, A, Palmer, M, Crowl, T. (1999). The Role of Benthic Invertebrate Species in Freshwater Ecosystems: Zoobenthic species influence energy flows and nutrient cycling. *BioScience*. Vol. 49 No. 2. 119-127.



### 5.1 Biodiversity

An aquatic ecosystem that is dominated by a small number of species is typically viewed as unhealthy. A drop in biodiversity between two sites can be an indicator of an impacted ecosystem. Biodiversity was calculated by comparing the number of separate benthic taxonomic groups (groups of related species) caught at a location against the 27 potential benthic taxonomic groups typically present within waterbodies in Ontario that are included in the OBBN protocol. The results from the study site showed a 3% decrease in species richness as compared to the control site which can be interpreted as a small decrease in biodiversity. This is based on the study site reporting a mean of 11.8 independent taxa and the control site reporting a mean of 12.7 independent taxa. An Ontario wide study found mean numbers of independent taxa of 12.1 across their sampling sites<sup>2</sup>. This puts the control site as having reported an above average richness as compared to the province where the study site had a below average richness. It should be noted that this difference in biodiversity is not large and the small sample size prevents any statistical comparison. No seasonal variations were observed.

### 5.2 Percentage Dominant

Related to biodiversity is the percentage dominant indicator. OBBN collections having more than 45% of their catch from one dominant species are considered extreme and can indicate poor ecosystem health. The study site had one instance of the dominant species comprising more than 45% of the catch in one of the subsamples. The control site had no instances of dominant species comprising more than 45% of the catch. While the dominant species exceedance could indicate poor benthic ecosystem health at the study site it is important to note that this exceedance represents 1/12 of the overall sampling events at the study site and as such is not a strong indicator. No seasonal variations were observed.

### 5.3 Percentage EPT

Species that are sensitive to changes in their environment are labeled indicator species. The OBBN protocol lists three important indicator species that can be used as a combined indicator of ecosystem health: Mayflies (*Ephemeroptera*), Stoneflies (*Plecoptera*) & Caddisflies (*Trichoptera*). Together these make up percentage EPT. The percentage EPT at the study site showed a 4% decrease as compared to the control site. The study site reported 21% EPT and the control site reported 25% EPT. An Ontario wide study found mean EPT of 25% across their sampling sites<sup>2</sup>. This puts the control site as having reported an average EPT as compared to the province where the study site had a below average EPT.

Mayflies made up the majority of the EPT reported at both of the study and control sites. Based on the substrate present at both of these sites this is not unexpected. Both sites had soft substrates dominated by silt and muck with some woody debris present. Many species of mayflies prefer soft substrates they can

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-Gazendam, E., Gharabaghi, B., Jones, C., Whiteley, H. (2013). Evaluation of the Qualitative Habitat Evaluation Index as a Planning and Design Tool for Restoration of Rural Ontario Waterways. Canadian Water Resources Journal. Vol 36 Is. 2. 149-158.



burrow into such as the one present. Caddisflies made up the next most abundant EPT contributor at the site. Caddisflies species have adapted to many substrates including soft silty bottoms. As the colloquial name suggests stoneflies prefer substrates dominated by gravel & stone. As such their presence in any abundance at both sites would be unexpected. No seasonal variations were observed.

#### 5.4 Water Chemistry

Nitrate, Ammonia, Phosphorous (as Orthophosphate) were analysed. Water chemistry appears good with ranges falling within the Canadian Water Quality Guidelines for the Protection of Aquatic Life.<sup>3</sup> No noticeable differences in nutrient concentration were found between the study site and the control site. See Appendix B for further details. No seasonal variations were observed.

#### 5.5 Population Density

Population density or abundance was roughly measured using the number of scoops required to obtain a sufficient subsample size (>100 individuals). The study site reported a 57% increase in the scoops required to obtain sufficient subsample sizes. This would indicate a lower population density at the study site as compared to the control site. No seasonal variations were observed.

#### 5.6 Further Study

Should the Site report any more wastewater exceedances it could be worthwhile conducting a study shortly thereafter to determine immediate affects on the ecosystem. Continued study at the site would also allow for statistical comparisons between the study and control site to determine if differences between the two sites were statistically significant. See Appendix C for rough species data.

### **6.0 Conclusions**

While current datasets contain insufficient data to make any relevant statistical comparisons between the study and control sites, the results reported in this study seem to indicate that control site has a healthier benthic ecosystem as compared to the study site. This could indicate that the Ontario Graphite Site has had negative effect on the Magnetawan River. Continued monitoring could provide the necessary data for a statistical comparison.

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3

-Canadian Council of Ministers of the Environment. 2010. Canadian water quality guidelines for the protection of aquatic life: Ammonia. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

-Canadian Council of Ministers of the Environment. 2010. Canadian water quality guidelines for the protection of aquatic life: Nitrate. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

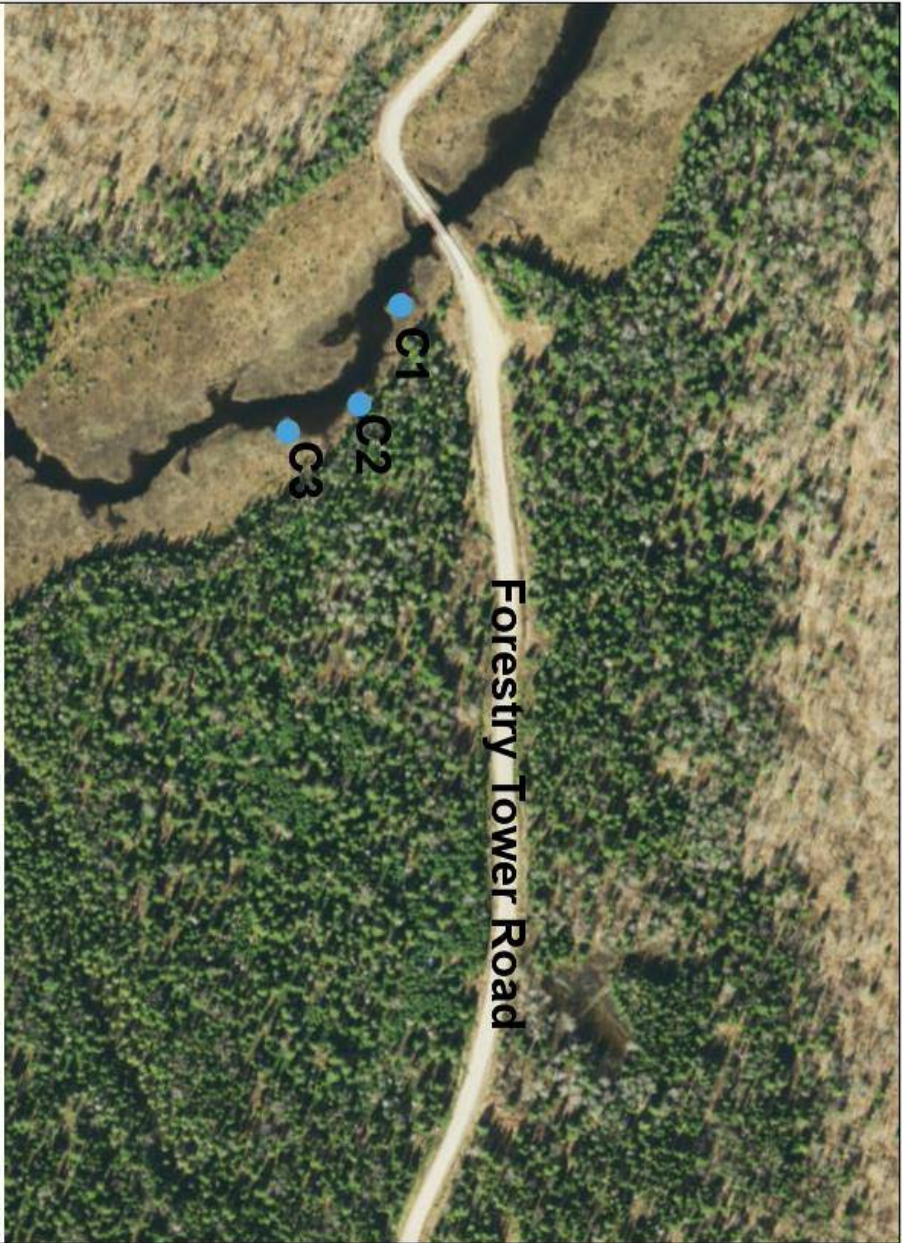
--Canadian Council of Ministers of the Environment. 2010. Canadian water quality guidelines for the protection of aquatic life: Phosphorous. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.





**UPSTREAM SAMPLING POINTS**

Notes: Enter map notes



This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources and Forestry (OMNRF) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

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**Legend**

- Assessment Point
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System
- Complex
- Watershed
- Provincial Heritage Site
- Water Conservation
- Heritage Conservation
- Stream Rehabilitation
- Area of Interest (Agriculture & Science)
- Heritage (Archaeological)
- Provincially Significant
- Environmentally Sensitive
- Other

**Ontario Plan**

- Boundary
- Other Value Conventions
- Land Use Designation
- Protected Countryside
- Towns and Villages
- Heritage
- Urban Design Area
- Specialty Crop Area
- Other

**Niagara Escarpment Plan (NEP)**

- Protected Open Space System
- Land Use Designation
- Environmentally Sensitive Area
- Ecological Protection Area
- Ecological Research Station
- Ecological Research Area
- Urban Area
- Other Urban Centre

**Oak Ridge Moraine Conservation Plan (ORM)**

- Boundary
- Land Use Designation
- Natural Core Area
- Natural Heritage Area
- Conservation Area
- Other
- Other
- Other
- Other
- Other
- Other







## **CONTROL SITES**

SITE	LOCATION	ACCURACY
C1	45.713608, -79.057721	+/- 4 M
C2	45.713492, -79.057330	+/- 4 M
C3	45.713308, -79.057029	+/- 4 M

## **STUDY SITES**

SITE	LOCATION	ACCURACY
S1	45.707718, -79.092067	+/- 4 M
S2	45.707545, -79.092743	+/- 4 M
S3	45.707126, -79.093387	+/- 4 M



## APPENDIX B: WATER CHEMISTRY

### CONTROL SITE

Date	NO3 (mg/L)	NH3-N (mg/L)	PO3 (mg/L)
19/05/2019	<0.1	0.24	0.02
26/07/2019	<0.1	0.21	0.01
14/09/2019	<0.1	0.11	0.02

### SAMPLING SITE

Date	NO3 (mg/L)	NH3-N (mg/L)	PO3 (mg/L)
19/05/2019	<0.1	0.26	0.03
26/07/2019	<0.1	0.20	0.02
14/09/2019	<0.1	0.09	0.02

### STANDARDS AND BLANKS

#### AMMONIA

Salicylate Method, Hach Program 10023

Trip Blanks: 19/05/2019- 0.00mg/L, 26/07/2019- 0.00mg/L, 14/09/2019- 0.00mg/L

Standards (2mg/L): 19/05/2019- 2.02mg/L, 26/07/2019- 1.98mg/L, 14/09/2019- 2.01mg/L

#### NITRATE

Cadmium Reduction Method, Hach Program 8171

Trip Blanks: 19/05/2019- 0.0 mg/L, 26/07/2019- 0.0mg/L, 14/09/2019- 0.0mg/L

Standards (2mg/L): 19/05/2019- 2.1mg/L, 26/07/2019 1.9mg/L, 14/09/2019- 2.0mg/L

#### PHOSPHOROUS, REACTIVE (ORTHOPHOSPHATE)

Ascorbic Acid Method, Hach Program 8048

Trip Blanks: 19/05/2019- 0.00mg/L, 26/07/2019- 0.00mg/L, 14/09/2019- 0.00mg/L

Standards (2mg/L): 19/05/2019- 2.03mg/L, 26/07/2019- 1.98mg/L, 14/09/2019- 2.01mg/L





## APPENDIX C: BENTHIC POPULATION DATA

Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Discharge</i>	1	19/05/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms	2	1.71	1		
Nematoda	Roundworms	7	5.98			
Oligochaeta	Aquatic Earthworms	6	5.13	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	6	5.13	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites		0			
Ephemeroptera	Mayflies	19	16.24	1	16.24	
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	1	0.85	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	2	1.71	1	1.71	
Lepidoptera	Aquatic Moths	1	0.85	1		
Coleoptera	Beatles	30	25.64	1		25.64
Gastropoda	Snails and Limpets	1	0.85	1		
Chironomidae	Midges	20	17.09	1		
Tabanidae	Horse & Deer Flies	4	3.42	1		
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	15	12.82	1		
Tipulidae	Crane Flies	2	1.71	1		
Simuliidae	Black Flies	1	0.85	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>117</b>	<b>100</b>	<b>14</b>	<b>17.95</b>	<b>25.64</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Discharge</i>	2	19/05/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	3	2.97	1		
Oligochaeta	Aquatic Earthworms	9	8.91	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.99	1		
Amphipoda	Scuds	18	17.82	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites		0			
Ephemeroptera	Mayflies	17	16.83	1	16.83	
Anisopetera	Dragonflies	1	0.99	1		
Zygoptera	Damselflies	9	8.91	1		
Plecoptera	Stoneflies		0.00		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies	1	0.99	1		
Trichoptera	Caddisflies	4	3.96	1	3.96	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	3	2.97	1		
Gastropoda	Snails and Limpets	1	0.99	1		
Chironomidae	Midges	19	18.81	1		18.81
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	2	1.98	1		
Ceratopogonidae	No-see-ums		0			
Tipulidae	Crane Flies	4	3.96			
Simuliidae	Black Flies	9	8.91	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>101</b>	<b>100</b>	<b>14</b>	<b>20.79</b>	<b>18.81</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
Magnetawan River	Study Site: Below Ontario Graphite Discharge	3	19/05/2019	Afternoon	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	4	3.77	1		
Oligochaeta	Aquatic Earthworms	4	3.77	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.94	1		
Amphipoda	Scuds	23	21.70	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites	7	6.60	1		
Ephemeroptera	Mayflies	26	24.53	1	24.53	24.53
Anisopetera	Dragonflies	1	0.94	1		
Zygoptera	Damselflies	3	2.83	1		
Plecoptera	Stoneflies	1	0.94	1	0.94	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies	1	0.94	1		
Trichoptera	Caddisflies	4	3.77	1	3.77	
Lepidoptera	Aquatic Moths	3	2.83	1		
Coleoptera	Beatles	5	4.72	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	12	11.32	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	7	6.60	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	4	3.77	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>106</b>	<b>100</b>	<b>16</b>	<b>29.25</b>	<b>24.53</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	1	19/05/2019	Afternoon	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms	1	0.96	1		
Nematoda	Roundworms	2	1.92	1		
Oligochaeta	Aquatic Earthworms	2	1.92	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.96	1		
Amphipoda	Scuds	29	27.88	1		27.88
Decapoda	Crayfish		0			
Trombidiformes	Mites	6	5.77	1		
Ephemeroptera	Mayflies	29	27.88	1	27.88	27.88
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	5	4.81			
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies	1	0.96	1		
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths	1	0.96	1		
Coleoptera	Beatles	6	5.77	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	8	7.69			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	2	1.92	1		
Ceratopogonidae	No-see-ums	7	6.73	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	4	3.85	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>104</b>	<b>100</b>	<b>13</b>	<b>27.88</b>	<b>27.88</b>





Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	2	19/05/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	1	0.94	1		
Oligochaeta	Aquatic Earthworms	5	4.72	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.94	1		
Amphipoda	Scuds	29	27.36	1		27.36
Decapoda	Crayfish		0			
Trombidiformes	Mites	3	2.83	1		
Ephemeroptera	Mayflies	27	25.47	1	25.47	
Anisopetera	Dragonflies	2	1.89	1		
Zygoptera	Damselflies	7	6.60	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	7	6.60	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	7	6.60	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	9	8.49	1		
Tipulidae	Crane Flies	3	2.83	1		
Simuliidae	Black Flies	5	4.72	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>106</b>	<b>100</b>	<b>13</b>	<b>25.47</b>	<b>27.36</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	3	19/05/2019	Evening	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	1	0.98	1		
Oligochaeta	Aquatic Earthworms	5	4.90	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	38	37.25	1		37.25
Decapoda	Crayfish		0			
Trombidiformes	Mites	4	3.92	1		
Ephemeroptera	Mayflies	23	22.55	1	22.55	
Anisopetera	Dragonflies	1	0.98	1		
Zygoptera	Damselflies	11	10.78	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	2	1.96	1	1.96	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	7	6.86	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	5	4.90			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	4	3.92	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	1	0.98	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>102</b>	<b>100</b>	<b>11</b>	<b>24.51</b>	<b>37.25</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Site</i>	1	26/07/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	1	0.96	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	15	14.42	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites	22	21.15	1		21.15
Ephemeroptera	Mayflies	21	20.19	1	20.19	
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	3	2.88	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	6	5.77	1	5.77	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	5	4.81	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	12	11.54	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	6	5.77	1		
Ceratopogonidae	No-see-ums	13	12.50	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>104</b>	<b>100</b>	<b>10</b>	<b>25.96</b>	<b>21.15</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Site</i>	2	26/07/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	1	0.93	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.93	1		
Amphipoda	Scuds	22	20.37	1		20.27
Decapoda	Crayfish		0			
Trombidiformes	Mites	9	8.33	1		
Ephemeroptera	Mayflies	14	12.96	1	12.96	
Anisopetera	Dragonflies	9	8.33	1		
Zygoptera	Damselflies	8	7.41	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	15	13.89	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	3	2.78	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	5	4.63	1		
Ceratopogonidae	No-see-ums	17	15.74	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	4	3.70	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>108</b>	<b>100</b>	<b>12</b>	<b>12.96</b>	<b>20.27</b>





Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Site</i>	3	26/07/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	2	1.92	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	44	42.31	1		42.31
Decapoda	Crayfish		0			
Trombidiformes	Mites	12	11.54	1		
Ephemeroptera	Mayflies	17	16.35	1	16.35	
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	11	11	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies	2	2	1		
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	9	8.65	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges		0			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	4	3.85	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies	3	2.88	1		
<b>Totals:</b>		<b>104</b>	<b>100</b>	<b>9</b>	<b>16.35</b>	<b>42.31</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	1	26/07/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms	1	0.96	1		
Nematoda	Roundworms	2	1.92	1		
Oligochaeta	Aquatic Earthworms	2	1.92	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.96	1		
Amphipoda	Scuds	29	27.88	1		27.88
Decapoda	Crayfish		0			
Trombidiformes	Mites	6	5.77	1		
Ephemeroptera	Mayflies	29	27.88	1	27.88	27.88
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	5	4.81			
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies	1	0.96	1		
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths	1	0.96	1		
Coleoptera	Beatles	6	5.77	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	8	7.69			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	2	1.92	1		
Ceratopogonidae	No-see-ums	7	6.73	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	4	3.85	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>104</b>	<b>100</b>	<b>13</b>	<b>27.88</b>	<b>27.88</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	2	26/07/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	1	0.94	1		
Oligochaeta	Aquatic Earthworms	5	4.72	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.94	1		
Amphipoda	Scuds	29	27.36	1		27.36
Decapoda	Crayfish		0			
Trombidiformes	Mites	3	2.83	1		
Ephemeroptera	Mayflies	27	25.47	1	25.47	
Anisopetera	Dragonflies	2	1.89	1		
Zygoptera	Damselflies	7	6.60	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	7	6.60	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	7	6.60	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	9	8.49	1		
Tipulidae	Crane Flies	3	2.83	1		
Simuliidae	Black Flies	5	4.72	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>106</b>	<b>100</b>	<b>13</b>	<b>25.47</b>	<b>27.36</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	3	26/07/2019	Evening	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms	1	0.98	1		
Oligochaeta	Aquatic Earthworms	5	4.90	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	38	37.25	1		37.25
Decapoda	Crayfish		0			
Trombidiformes	Mites	4	3.92	1		
Ephemeroptera	Mayflies	23	22.55	1	22.55	
Anisopetera	Dragonflies	1	0.98	1		
Zygoptera	Damselflies	11	10.78	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	2	1.96	1	1.96	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	7	6.86	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	5	4.90			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	4	3.92	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	1	0.98	1		
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>102</b>	<b>100</b>	<b>11</b>	<b>24.51</b>	<b>37.25</b>





Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Discharge</i>	<i>1</i>	<i>14/09/2019</i>	<i>Afternoon</i>	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	4	3.88	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	1	1		
Amphipoda	Scuds	48	46.60	1		46.6
Decapoda	Crayfish		0			
Trombidiformes	Mites	10	9.71	1		
Ephemeroptera	Mayflies	24	23.30	1	23.30	
Anisopetera	Dragonflies		0			
Zygoptera	Damselflies	11	10.68	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	1	0.97	1	0.97	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	2	1.94	1		
Gastropoda	Snails and Limpets	1	0.97	1		
Chironomidae	Midges	1	0.97	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums		0			
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>103</b>	<b>100</b>	<b>10</b>	<b>24.27</b>	<b>46.6</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Discharge</i>	2	14/09/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	3	2.94	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams	4	3.92	1		
Amphipoda	Scuds	18	17.65	1		17.65
Decapoda	Crayfish	3	2.94	1		
Trombidiformes	Mites	5	4.90	1		
Ephemeroptera	Mayflies	14	13.73	1	13.73	
Anisopetera	Dragonflies	3	2.94	1		
Zygoptera	Damselflies	9	8.82	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	2	1.96	1	1.96	
Lepidoptera	Aquatic Moths	2	1.96	1		
Coleoptera	Beatles	14	13.73	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	5	4.90	1		
Tabanidae	Horse & Deer Flies	2	1.96	1		
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	14	13.73	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies	4	3.92	1		
<b>Totals:</b>		<b>102</b>	<b>100</b>	<b>15</b>	<b>15.69</b>	<b>17.65</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Study Site: Below Ontario Graphite Discharge</i>	3	14/09/2019	Afternoon	<i>Fieldwebster Environmental Consulting</i>	<i>Jesse Fieldwebster</i>
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	1	0.96	1		
Hirudinea	Leeches		0			
Isopoda	Sow Bugs		0			
Bivalvia	Clams		0			
Amphipoda	Scuds	15	14.42	1		
Decapoda	Crayfish	1	0.96	1		
Trombidiformes	Mites	5	4.81	1		
Ephemeroptera	Mayflies	35	33.65	1	33.65	33.65
Anisopetera	Dragonflies	5	4.81	1		
Zygoptera	Damselflies	32	31	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies	1	0.96	1	0.96	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	5	4.81	1		
Gastropoda	Snails and Limpets		0			
Chironomidae	Midges	4	3.85	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums		0			
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies		0			
<b>Totals:</b>		<b>104</b>	<b>100</b>	<b>10</b>	<b>34.62</b>	<b>33.65</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
Magnetawan River	Control Site: Above Ontario Graphite Discharge	1	14/09/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms	2	1.96	1		
Nematoda	Roundworms	1	0.98	1		
Oligochaeta	Aquatic Earthworms	6	5.88	1		
Hirudinea	Leeches	3	2.94	1		
Isopoda	Sow Bugs		0			
Bivalvia	Clams	2	1.96	1		
Amphipoda	Scuds	30	29.41	1		29.41
Decapoda	Crayfish		0			
Trombidiformes	Mites	3	2.94	1		
Ephemeroptera	Mayflies	25	24.51	1	24.51	
Anisopetera	Dragonflies	6	5.88	1		
Zygoptera	Damselflies	9	8.82	1		
Plecoptera	Stoneflies	1	0.98	1	0.98	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	4	3.92	1		
Gastropoda	Snails and Limpets	4	3.92	1		
Chironomidae	Midges		0			
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	2	1.96	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies	4	3.92	1		
<b>Totals:</b>		<b>102</b>	<b>100</b>	<b>15</b>	<b>25.49</b>	<b>29.41</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	2	14/09/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms		0			
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	2	1.55	1		
Hirudinea	Leeches	1	0.78	1		
Isopoda	Sow Bugs		0			
Bivalvia	Clams	1	0.78	1		
Amphipoda	Scuds	31	24.03	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites	7	5.43	1		
Ephemeroptera	Mayflies	26	20.16	1	20.16	
Anisopetera	Dragonflies	2	1.55			
Zygoptera	Damselflies	39	30.23	1		30
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	9	6.98	1		
Gastropoda	Snails and Limpets	7	5.43	1		
Chironomidae	Midges	1	0.78	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos		0			
Ceratopogonidae	No-see-ums	2	1.55	1		
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies		0			
Misc. Diptera	Misc. True Flies	1	0.78	1		
<b>Totals:</b>		<b>129</b>	<b>100</b>	<b>12</b>	<b>20.16</b>	<b>30</b>



Water Body	Site	Subsample	Date	Time	Organisation	Contact
<i>Magnetawan River</i>	<i>Control Site: Above Ontario Graphite Discharge</i>	3	14/09/2019	Morning	Fieldwebster Environmental Consulting	Jesse Fieldwebster
Scientific Name	Common Name	Count	Correction	Richness	% EPT	% Dominant
Coelenterata	Hydras		0			
Turbellaria	Flatworms	1	0.95	1		
Nematoda	Roundworms		0			
Oligochaeta	Aquatic Earthworms	1	0.95	1		
Hirudinea	Leeches	1	0.95	1		
Isopoda	Sow Bugs		0			
Bivalvia	Clams	2	1.90	1		
Amphipoda	Scuds	18	17.14	1		
Decapoda	Crayfish		0			
Trombidiformes	Mites	3	2.86	1		
Ephemeroptera	Mayflies	25	23.81	1	23.81	23.81
Anisopetera	Dragonflies	1	0.95	1		
Zygoptera	Damselflies	25	24	1		
Plecoptera	Stoneflies		0		0.00	
Hemiptera	True Bugs		0			
Megaloptera	Fishflies & Alderflies		0			
Trichoptera	Caddisflies		0		0.00	
Lepidoptera	Aquatic Moths		0			
Coleoptera	Beatles	12	11.43	1		
Gastropoda	Snails and Limpets	12	11.43	1		
Chironomidae	Midges	1	0.95	1		
Tabanidae	Horse & Deer Flies		0			
Culicidae	Mosquitos	1	0.95	1		
Ceratopogonidae	No-see-ums		0			
Tipulidae	Crane Flies		0			
Simuliidae	Black Flies	1	0.95	1		
Misc. Diptera	Misc. True Flies	1	0.95	1		
<b>Totals:</b>		<b>105</b>	<b>100</b>	<b>15</b>	<b>23.81</b>	<b>23.81</b>





## APPENDIX D: ONTARIO GRAPHITE DISCHARGE DATA

Ontario Graphite Ltd. informed the MOECC on December 22<sup>nd</sup> 2015 that it had stopped treating its wastewater which discharged into the Magnetawan River (it was later discovered that treatment actually stopped on November 19, 2015). The lack of treatment caused the pH of the effluent to drop to 3 and this in turn, mobilised metals into the wastewater. During the two MOECC inspections of the site when treatment had stopped, it was found that iron, nickel, zinc, total suspended solids & pH were all being discharged outside of their allowable limits. The resulting effluent resulted in 100% mortality of test organisms in MOECC tests.

	units	ECA Limits	MOECC Samples		
			08-Jan-16	12-Jan-16	19-Jan-16
arsenic	mg/l	0.05	0.0005 <=W		
cadmium	mg/l	0.001	0.000796	0.001 <=W	ND
copper	mg/l	0.05	0.00905	0.008 <T	ND
iron	mg/l	1	20.9	20.7	21.2
lead	mg/l	0.05	<MDL	0.005 <=W	ND
nickel	mg/l	0.1	0.229	0.254	ND
total Phosphorus	mg/l	0.25		0.0085	
total Suspended Solids	mg/l	15	19.5		26.11
Zinc	mg/l	0.1	0.474	0.483	0.42
pH	mg/l	6.5 - 8.5	3.33	3.3	3.36*

<=W = no measurable response (zero): <reported value

<T = a measurable trace amount, interpret with caution

ND = non-detect

\*OCR: results outside of calibrated range



Data obtained from company (note flow data not verified)

Month	Day	Polishing Pond	
		pH	m3/day
<b>November</b>	19	5	5380
	20	9	7844
	21	5	6574
	22		
	23	3.5	4270
	24	3	6574
	25	3	7844
	26	3	16080
	27	3.5	83700
	28	4	35510
	29	4	6574
	30	4	6574
<b>December</b>	1	3.5	5380
	2	3.5	3248
	3	3.5	2324
	4	3.5	1509
	5	3.5	1509
	6		
	7	3.5	1509
	8	3.5	1509
	9	3	821
	10	3.5	821
	11	3.5	1509
	12	3.5	1509
	13		
	14	3	5380
	15	3	10443
	16	3	7844
	17	3	7844
	18	3	7844
	19	3	5380
	20		
	21	3	3248
	22	3	3248
	23	3	5380
	24	3	3248



	25		
	26		
	27	2.5	2324
	28	3	1509
	29	3	1509
	30	3	821
	31	3	821
<b>January</b>	1		
	2	3	821
	3		
	4	3	821
	5	3	1509
	6	3	821
	7	3	1509
	8	3	1509
	9		
	10	4	1509
	11	3.5	2324
	12	3	2324
	13	3	1509
	14	3	1509
	15	3	1509
	16		
	17		
	18	3	5380
	19	3	5380
	20	3	3248
	21	3	3248
	22	3	2324
	23		
	24		
	25	3	2324
	26	3	2324
	27	3	1509
	28	3	1509
	29	3	1509
	30	5	2324
	31		



## APPENDIX E: STAFF QUALIFICATIONS

**Valerie Fieldwebster** was the Coordinator for the Magnetawan Watershed Land Trust (MWLT) for 7 years and has now transitioned to the position of special project consultant. She has more than 30 years of experience of working with Environmental Conservation Organizations. She was the recipient of the Ontario Land Trust Alliance 2019 Professional Visionary Award, the 2016 Community Outreach Award and was a guest speaker at the 2016 International Land Conservation Conference in Minneapolis, the OLTA Annual Gatherings and the Cross Border Conservation Workshop in Toronto in 2017. She obtained her Ontario Biomonitoring Benthic Network Certificate in 2014 and holds an honours Degree in Geography, and studied Botany at the University of Lethbridge.

**Jesse Fieldwebster** is a Manager in the Lands and Resources Department of the Métis Nation of Ontario as well as working as an independent environmental consultant. He has worked in the environmental field for over 15 years including working for a conservation authority, commercial laboratory, energy utility, multiple universities & a number of environmental NGOs. He completed a Masters Degree in Environmental Engineering at Griffith University in Australia. He studied International Development and Environmental Science during his Undergraduate Degree at the University of Guelph. Environmental certifications include Ontario Benthos Biomonitoring Network (MOECP), Ontario Wetland Evaluation System (MNRF), Ontario Stream Assessment Fish ID (MNRF) and Assessing Headwater Features (TRCA). He currently sits as a board member of the Huronia Land Conservancy.