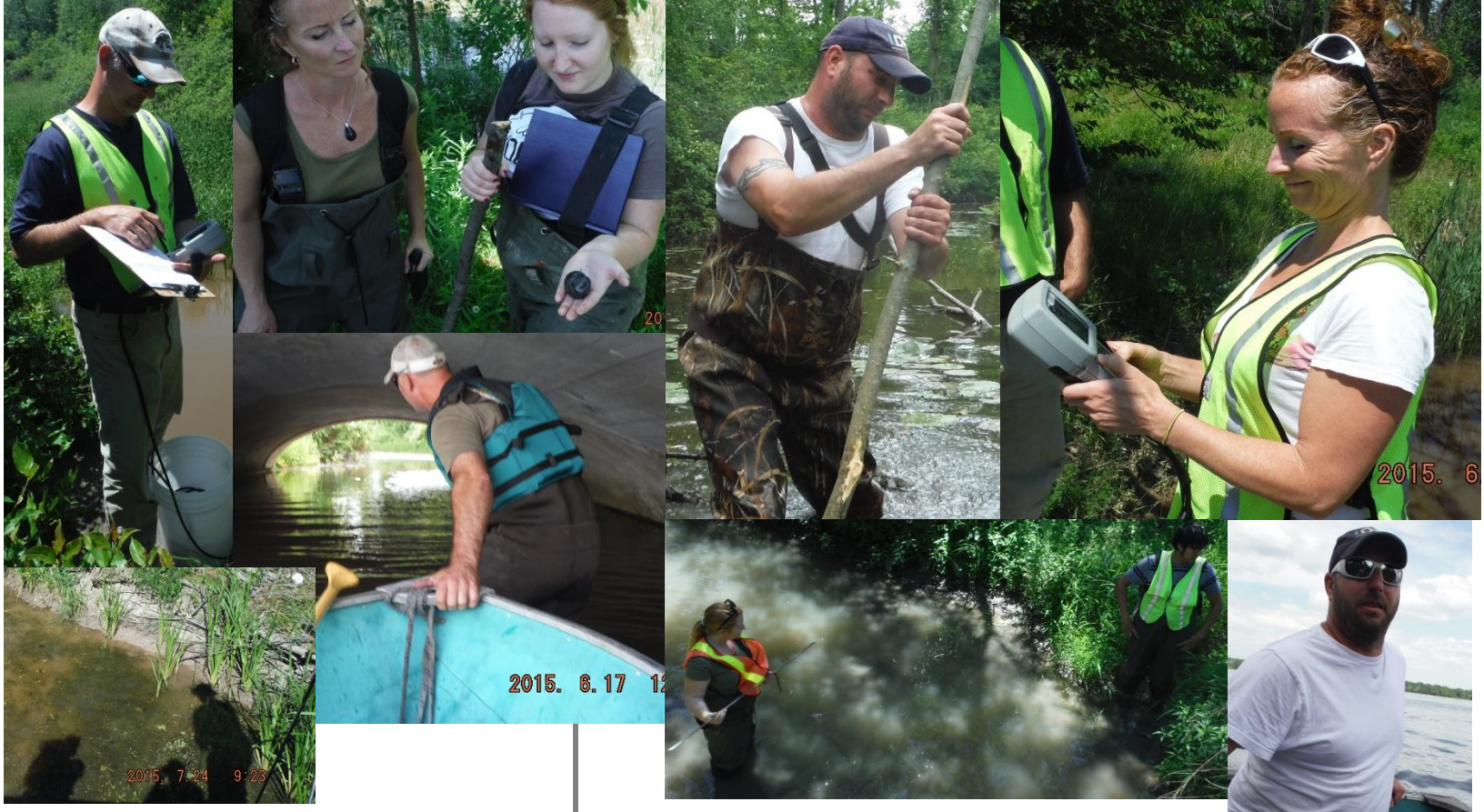

Summer Works 2015

E. Appleton, T. Bearss, A-M. Cloutier, T. Coopman, TJ. Sferrazza, B. Smalldon, J. Villeneuve

FRIENDS OF FORT ERIE'S CREEKS

FOFEC.CA

"Education, Advocacy, Remediation"

Niagara College Canada

NPAAMB

Friends of the Environment Foundation

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Introduction

FOFEC (Friends of Fort Erie's Creeks) is a non-profit organization located within the boundaries of the Town of Fort Erie. FOFEC was founded and sustained by volunteers who are genuinely concerned for the preservation, restoration, and rehabilitation of the creeks and the associated area watersheds.

By using sound environmental knowledge and promotion of watershed preservation to the public, the volunteers at FOFEC hope to maintain and enhance area watersheds for future generations. The work force of the Summer Works 2015 program consisted of four Niagara College students from the environmental technician field and lab co-op program and two students working through the Niagara Peninsula Aboriginal Area Management Board (NPAAMB) who were instrumental in the conduction of the program. The program was carried out from June 22nd until August 29th, from 9:00 am to 3:00 pm. The program was run and managed by a Niagara College graduate of both the environmental technician program as well as the ecosystem restoration graduate certificate program.

The purpose of this report is to provide the Friends of Fort Erie's Creeks and the public of Fort Erie with baseline data regarding the status of the Black Creek and Baker's Creek watershed areas as well as the mouths and drains that drain into the Niagara River and into Lake Erie. These studies are based on phosphate contamination from runoff, and outline other various works carried out during the summer term.

Background

Friends of Fort Erie Creeks were formed as the "Ad-Hoc Black Creek Clean-Up Committee" in 1980 as a result of a petition put forth by citizens of the Black Creek area. As a subcommittee of the town council, they were given the responsibility of cleaning up Black, Beaver and Frenchman's Creeks. Three years later, after changing their name to include all of Fort Erie's Creeks, they became a non-profit, registered charity. Restoration work has since expanded to include 6 Mile Creek as well as Black, Beaver and Frenchman's Creek. Since 1980 the Friends of Fort Erie's Creeks (FOFEC) have been committed to the protection, restoration and improvement of the local waterscape, so that healthy ecosystems exist for people and wildlife. FOFEC endeavors to accomplish this through assessment, analysis and rehabilitation.

Proven awareness of issues and practices with the public is part of our daily operations and are well documented in our monthly/yearly reports. Developing and maintaining reports helps cooperative efforts between government, industry, public, and by undertaking interventions where required. FOFEC's strategic plan summarizes all reports and activities to insure long term restoration results and continued success in collaboration with the Town of Fort Erie, DFO, MNR, NPCA and Niagara College.

FOFEC's summer co-op program facilitates the ongoing collection of water quality data and the maintenance of all local watercourses. Annual environmental sampling results are well documented via a summer works report and the report is shared with various environmental agencies to achieve continued success in maintaining sustainability in all projects.

Goals and Objectives

- Under the general guidance and direction of the Board, the use of the multi-parameter YSI 6600 V2-4 Sonde meter, was intended to monitor sites along Fort Erie's creeks. Testing parameters include, but are not limited to: temperature, dissolved oxygen, specific conductance, pH, total dissolved solids, turbidity, and chlorophyll.

- Using Google Earth and NPCA Navigator to locate and identify data collection sites to maintain integrity.

- Identify and note changes at each site that may compromise the quality of the water, and the flow of the system as a whole. This may include: water level, blockages, erosion, debris, land usage etc.

- Note any amphibians, birds, reptiles and mammals, as well as any aquatic and terrestrial plants.

- Sample and test soil and identify soil types along the creeks being sampled.

- Complete laboratory analysis on water and soil sampled to identify phosphates levels in the local bodies of water as well as identify any other possible contaminants entering the system through runoff by analysing soil.

- Perform biological monitoring following the Ontario Benthos Biomonitoring Network (OBBN) protocol in order to identify an overall state of the creeks in our studies for the season.

Water Sampling Guidelines

Water sampling and analysis of site locations were conducted on a weekly basis from the time period of June 22nd to August 29th 2015.

Parameters tested include: temperature, dissolved oxygen, specific conductance, pH, total dissolved solids, turbidity, and chlorophyll.

Parameters

Temperature

The Provincial Water Quality Objectives has a general guideline for this parameter which states that the natural thermal regime of any body of water shall not be altered so as to impair the quality of the natural environment. In particular, the diversity, distribution and abundance of plant and animal life shall not be significantly changed. The PWQO and Canadian Water Quality Guidelines provide additional data related to potential dischargers of waste water which is not relative at this time.

Specific Conductance

Conductivity is a measure of the ability of water to pass an electrical current. For the purposes of this report, conductivity measured with the Sonde 6600 is corrected to 25˚C, and is therefore referred to as “Specific Conductance”. Specific Conductance is an indirect measure of the amount of dissolved substances (salts).

Conductivity may influence the toxicity of many substances. Typically, purer water possesses lower Specific Conductance. Low Specific Conductance ***(0 - 200 µS/cm)*** is an indicator of ***pristine*** or

background conditions. Mid-range conductance ***(200 - 1000 µS/cm)*** is the ***normal*** *background* for most major rivers. High conductance ***(1000 - 10,000 µS/cm)*** is an indicator of ***saline conditions***. Conductivity is temperature sensitive and follows the same trend as water temperature (Environment Canada).

Total Dissolved Solids (TDS)

Currently there is no Canadian Environmental Quality Guideline or Provincial Water Quality Objective for TDS in surface or ground waters. The Ontario Drinking-water Standards, Objectives and Guidelines however, has an aesthetic objective of ≤500 mg/L to ensure palatability and prevent excessive scaling.

Dissolved Oxygen

Low DO levels (0-8 mg/L) are an indicator of high oxygen demand on the water and can result in fish kills (0-4 mg/L). ***High DO levels (12 to 20 mg/L)***, can be caused by excessive algal and macrophyte growth. ***Mid-range DO levels (8-12 mg/L)*** are usually an indicator of a healthy system (Health Canada).

According to the Canadian Environmental Quality Guideline, the lowest acceptable dissolved oxygen concentration for the protection of warm water biota in ***early life stages is 5.5 mg/L***, and in ***other stages 6.0 mg/L***. The Provincial Water Quality Objective for the lowest acceptable dissolved oxygen concentration for the protection of warm water biota is >***4 mg/L in early stages – >7 mg/L in other stages.***

pH

According to the Provincial Water Quality Objective the pH should be maintained within the ***range of 6.5 - 8.5 to protect aquatic life.*** According to the Canadian Environmental Quality Guideline a ***pH of 6.5 – 9.0*** should be maintained for the protection of aquatic life.

Chlorophyll

Chlorophyll-a concentrations can be used to classify the trophic status of a waterbody. A system with low productivity, or an ***oligotrophic system***, has chlorophyll-a concentration of ***<2.5 µg/L***, a medium productivity or ***mesotrophic system*** has chlorophyll-a concentration of approximately ***2.5 - 8 µg/L***, a high productivity or ***eutrophic system*** has chlorophyll-a concentration of ***8 – 25 µg/L*** (Laval University). Currently there is no Provincial or Federal Guideline or Objective for this parameter.

Turbidity

The Provincial Water Quality Objectives guideline for turbidity in surface and groundwater indicates that suspended matter should not be added to surface water in concentrations that will change the natural Secchi disc reading by more than ***10 percent***. According to the Canadian Environmental Quality Guidelines, a maximum increase of ***8 NTUs*** from background levels at any one time when background levels are between ***8 and 80 NTUs*** is the standard; turbidity should not increase more than ***10%*** of background levels when background is ***> 80 NTUs*** (CEQG).

Health Canada's Guidelines for Canadian Recreational Water Quality has set a standard of ***50 NTU's*** in order to satisfy most recreational uses.

Health Canada indicates that suggested values for turbidity, clarity and colour have been proposed; however, it is recognized that the natural levels of these parameters in Canadian waters can vary considerably. Thus, it is recommended that, when evaluating these parameters as part of an Environmental Health and Safety Survey, the associated values also be interpreted as not being significantly increased over that which would be considered natural background.

Phosphate

Phosphates are used in certain detergents and cleaning products to soften water, reduce spotting and rusting, hold dirt, and increase performance. The amount found in water is generally not more than ***0.1 ppm unless*** the water has become polluted from waste water sources or ***excessive drainage from agricultural areas***. When phosphorus is present in excess of the concentrations required for normal aquatic plant growth, a process called eutrophication takes place. This creates a favorable environment for the increase in algae and weeds. When algae cells die, oxygen is used in the decomposition and fish kills often result. Rapid decomposition of dense algae scums with associated organisms give rise to foul odors and hydrogen sulfide gas (LaMotte).

Currently there is no Canadian Environmental Quality Guideline, Ontario Drinking-water Quality Standard, or Provincial Water Quality Objective for phosphate. However, ***phosphate is the common inorganic form of phosphorus*** which is present in the natural environment, existing as deposits or rocks which are mined to get phosphorous. According to the Canadian Environmental Quality Guidelines

freshwater containing concentrations of inorganic phosphorous which exceed ***0.1 mg/L*** may be an indicator of hyper-eutrophic conditions (waters extremely rich in nutrients and minerals).

The LaMotte Ascorbic Acid Reduction Method was used for phosphate analysis. This method applies to drinking, surface, and saline waters; domestic and industrial wastes and is based on reactions that are specific for orthophosphate. LaMotte states with the sampling procedures that the amount of phosphorous found in water is ***generally not more than 0.1 mg/L*** unless the water has become polluted from waste water sources or excessive drainage from agricultural areas.

Description of Study Scope

Phosphates

Phosphates are nutrients vital to human, animal, and plant life. It is one of the most common substances in our environment, naturally occurring in our food, our water and our bodies. Phosphates enter waterways through natural and un-natural means such as:

- Human and animal waste,
- Phosphorus rich bedrock,
- Laundry and cleaning solutions,
- Industrial effluents,
- Farmland fertilizer runoff.

These phosphates can become a major problem when they over fertilize aquatic plants causing the eutrophication process to speed up dramatically. Eutrophication is the end result of a natural aging process that a body of water, such as a bay or lake, undergoes. This is what can be considered a dead lake. The eutrophication process occurs when an increase of nutrients within the body of water causes rapid plant growth. The plants die more quickly than they can be decomposed. The dead plant material builds up and together with sediment entering the water, fills in the bed of the bay or lake making it shallower. In natural conditions this process can take thousands of years.

Human presence around bodies of water can cause cultural eutrophication. This is an unnatural speeding up of the eutrophication process due to human's addition of phosphates, nitrogen, and sediment to the water. Bodies of water are being aged at a much faster rate than geological forces can create new ones.

While testing for cultural eutrophication, one would expect to find an algal bloom or scum on the water accompanied by a fishy smell to the water and low dissolved oxygen content. Lake Erie often experiences algae blooms because of high nutrient levels from many unnatural sources. Creeks in Fort Erie were tested for phosphates because if the algae are already blooming in Lake Erie, the phosphates will already be in the algae, not in the water. The algae bloom should start where running water enters the lake or bay.

There are several different kinds of phosphates in the water, however a total phosphate-phosphorous reading is all that is needed to calculate the water quality. The chart below can be used as a guideline fro phosphate levels and their collation with the health of a body of water:

0.01 - 0.03 mg/L - the level in uncontaminated lakes
0.025 - 0.1 mg/L - level at which plant growth is stimulated
0.1 mg/L - maximum acceptable to avoid accelerated eutrophication
> 0.1 mg/L - accelerated growth and consequent problems

Physical Parameters

The physical properties of a stream, such as the channel shape, the substrate size, and the available habitats, play an important role in determining the type and diversity of organisms that the stream can support. These physical attributes provide useful information on ecosystem function and stream health.

Habitat diversity

In the field, technicians measured a variety of aspects of the physical environment in a stream. One important physical attribute is habitat diversity. A typical stream contains three major types of habitats: riffles, runs, and pools. A riffle is an area of fast moving, churning water. A run is an area of smoothly moving water. A pool is an area of still or stagnant water. Each habitat type supports different types of

aquatic life, so a stream with a greater diversity of habitat types will support a greater diversity of organisms.

Stream channel

Another useful physical measure is the shape of the cross section of a stream channel. A deeper, channel is often the result of direct human impacts (e.g., cementing or dredging the stream through urban areas). Impacted channels can have faster flow rates and greater turbidity (due to more sediment in the water). Bank-full width, wetted width, hydraulic head, and average water depth are all parameters measured by our team.

Substrate size

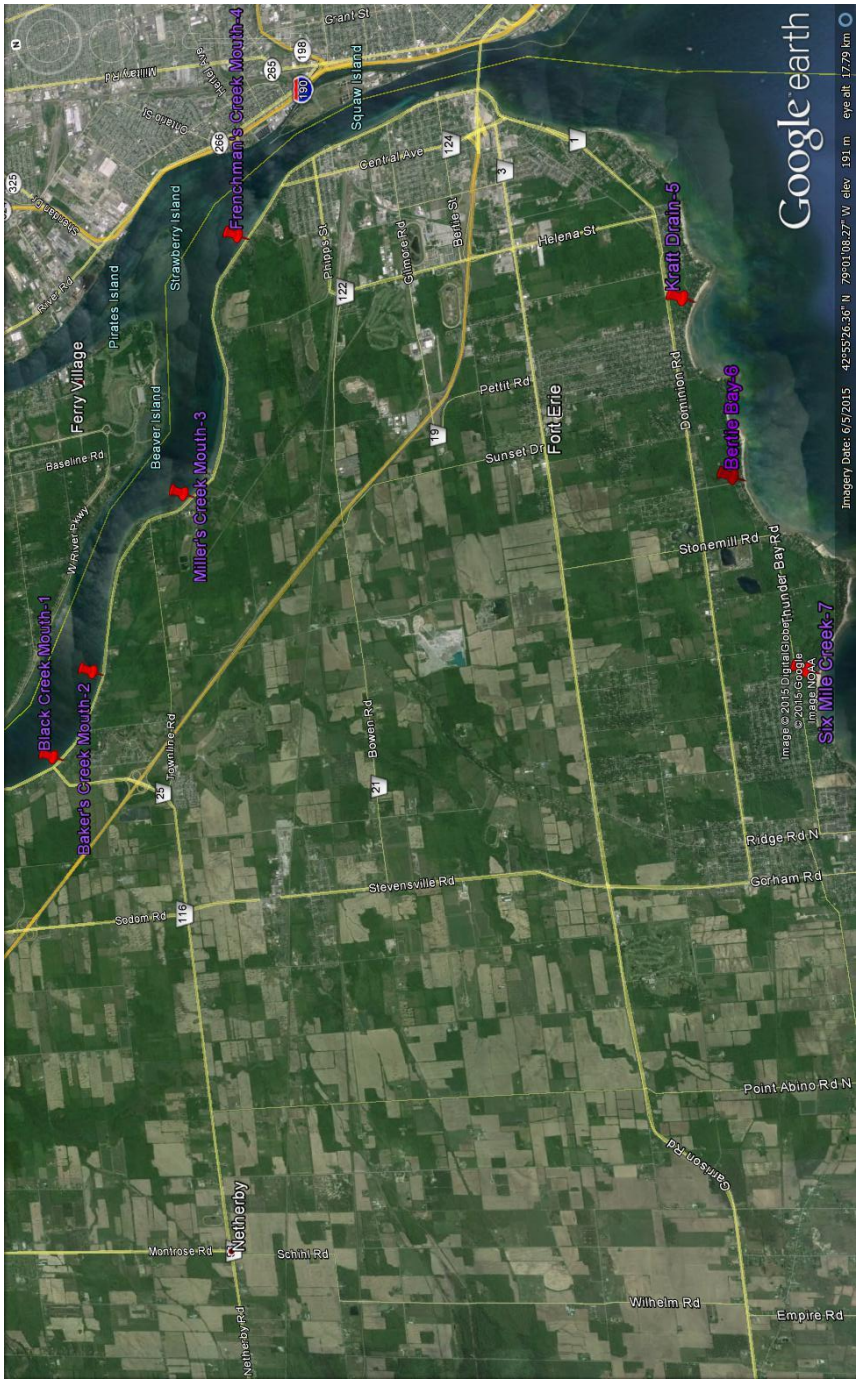
A third aspect of a stream's physical environment is the substrate size. Stream substrates may include clay, sand, gravel, rock, or even bedrock. Since different organisms have different habitat requirements, a stream with a variety of substrate sizes will generally support a greater diversity of organisms. Some urban streams are mostly sand, while other urban streams are mostly rock. A more natural stream generally has a greater variety of substrate sizes.

Vegetation Cover

In the field we measured two aspects of vegetation cover riparian cover and in-stream cover. Riparian cover a percentage of cover providing shade to the stream from surrounding vegetation. Riparian cover is important for keeping the water cool; this can be advantageous for species diversity. In-stream cover is a percentage of cover provided by vegetation and objects located within the stream. This cover provides habitat and places to hide for fish and other water animals.

Mouths and Drains

Site Map



Phosphates

Phosphorus is in the environment naturally. It materializes in rocks and other mineral deposits. Aquatic plants need phosphorus to grow. When the phosphorus is released it is released as a phosphate ion which is soluble in water. There is typically < 0.1 ppm found in water. Phosphates are also found in fertilizers and laundry detergents. Table 1 shows the mean of the creek and drain sites sampled in the summer of 2015.

Phosphate Means

Site	ppm
1- Black Creek	0.03
2- Baker Creek	0.028
3- Miller's Creek	0.0325
4- Frenchman's Creek	0.0475
5- Kraft Drain	0.145
6- Bertie Bay Drain	0.1175
7- Six Mile Creek Drain	0.123

Table 1

Date: June 15, 2015

Site	Phosphates ppm
Site 1- Black Creek	**0.035**
Site 2- Baker Creek	**0.036**
Site 3- Miller's Creek	**0**
Site 4- Frenchman's Creek	**0.07**
Site 5- Kraft Drain	**0.735**
Site 6- Bertie Bay Drain	**0.105**
Site 7- 6 Mile Creek Drain	**0.116**

Table 2

Date: July 10. 2015

Site	Phosphates ppm
Site 1- Black Creek	**0.025**
Site 2- Baker Creek	**0.02**
Site 3- Miller's Creek	**0.065**
Site 4- Frenchman's Creek	**0.025**
Site 5- Kraft Drain	**0.095**
Site 6- Bertie Bay Drain	**0.13**
Site 7- 6 Mile Creek Drain	**0.13**

Table 3

The LaMotte Ascorbic Acid Reduction Method for Phosphate- Low Range was used with the smart spectrophotometer for analysis. Orthophosphate forms a blue colour, this reactions is specifically based for this test. This test can be applied to drinking, surface and saline waters, along with domestic and industrial wastes.

There are no Canadian water quality guidelines for phosphorus. All three drains are slightly above the average 0.1 ppm. When phosphorus is in excess of the concentrations of 0.1 ppm it could cause eutrophication. This produces unwarranted amount of plant and algae growth along with decomposition. Algae and decomposition of plant growth depletes the supply of oxygen in the water and intern's kills aquatic animal life. Excessive amounts of nutrients in a body of water are usually caused by runoff from the land. The nutrient runoff could be fertilizers, animal waste or sewage discharge. The land usage around these drains are agricultural, urbanized and a water treatment plant. It may be difficult to manage phosphorous in the drain site

Baker's Creek

Site Map

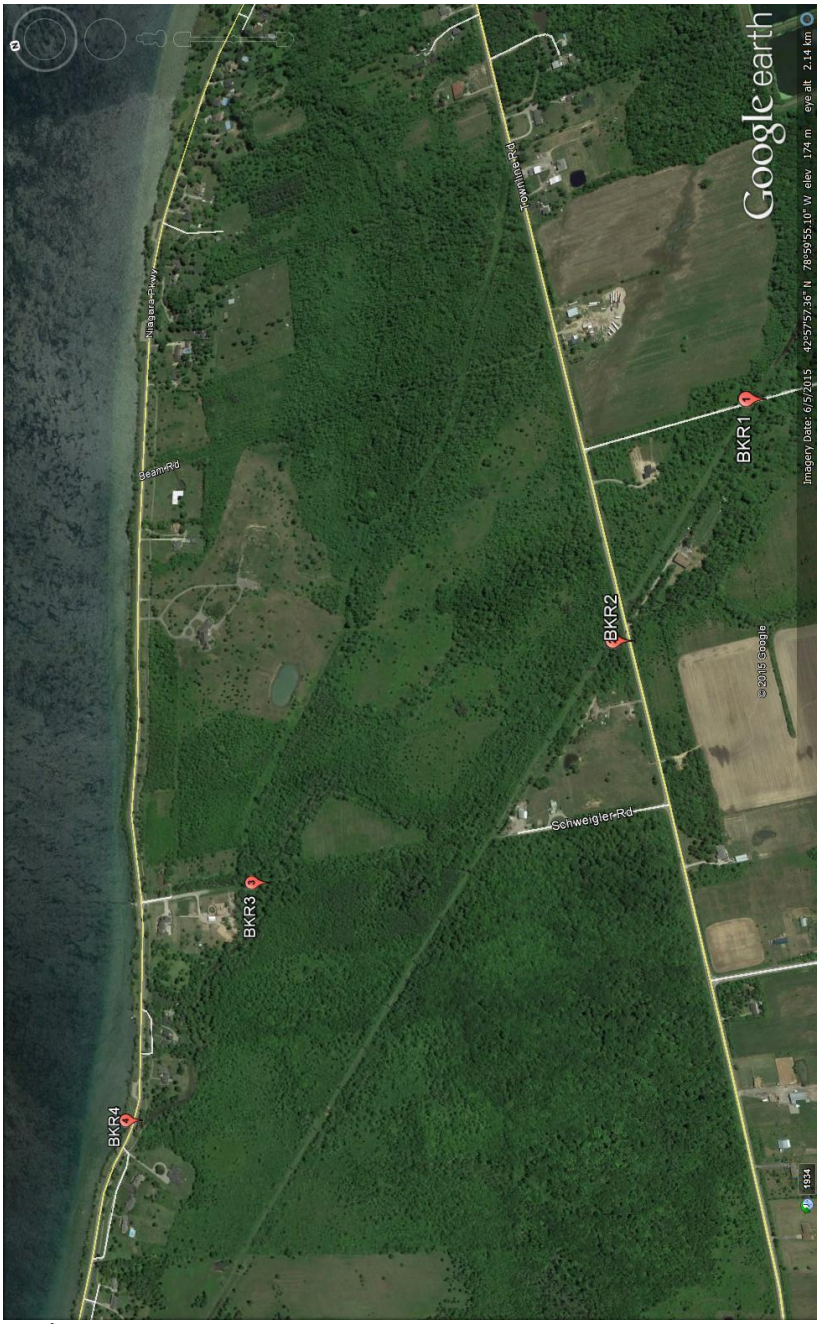


Figure 1

Physical Parameters

Date (MM/DD/YYYY): 08/05/2015

Stream Name: Baker's Creek

Time: 12:30

Location: Townline Road – Site 1

Technicians: AM. Cloutier, E. Appleton, TJ. Sferrazza, B. Smalldon

Conditions: Overcast, 19°C

Site Sketch/Photo:

SITE DRIED UP

Width:

Wetted Width (m):	**Bankfull Width (m):**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 0**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description:
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
20	**----------Mainly decomposing organic matter----------**			

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy √	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description:

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
----------Dried up completely----------					

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Residential
-Forest

Date (MM/DD/YYYY): 08/05/2015

Stream Name: Baker's Creek

Time: 12:45 pm

Location: Sumner Road - Site 2

Technicians: AM. Cloutier, TJ. Sferrazza, E. Appleton, B. Smalldon

Conditions: Overcast, 19°C

Site Sketch/Photo:

Width:

Wetted Width (m): Flooded Swamp Area	**Bankfull Width (m): Flooded Swamp Area**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %:	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
50	50			

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy √	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description:
95	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
-----	-----	-----	-----	-------	------

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

90% forested
One residential lot

Date (MM/DD/YYYY): 08/05/2015

Stream Name: Baker's Creek

Time: 1:10 pm

Location: Schweigler Road -Site 3

Technicians: AM. Cloutier, E. Appleton, TJ. Sferrazza, B. Smalldon

Conditions: Overcast, 19°C

Site Sketch/Photo:

Width:

Wetted Width (m): 8.0	**Bankfull Width (m): 8.5**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 5	**Pool %: 95**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Bank B
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion) √	Description: Bank A
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
50	50			

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy √	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description:
40	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
14	**0**	**54**	**0**	**21**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Forest
-House and farm

Date (MM/DD/YYYY): 08/05/2015

Stream Name: Baker's Creek

Time: 1:31 pm

Location: Niagara Parkway - Site 4

Technicians: AM. Cloutier, E. Appleton, TJ. Sferrazza, B. Smalldon

Conditions: Overcast, 19°C

Site Sketch/Photo:

Width:

Wetted Width (m): 16.5	**Bankfull Width (m): 18.0**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description:
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
20	**----------Mainly decomposing organic matter----------**			

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy √	Description:
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description:
80	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
----------Substrate too soft to do depth mesurements----------					

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Niagara Parkway
-Residential

Soils

Soil Map

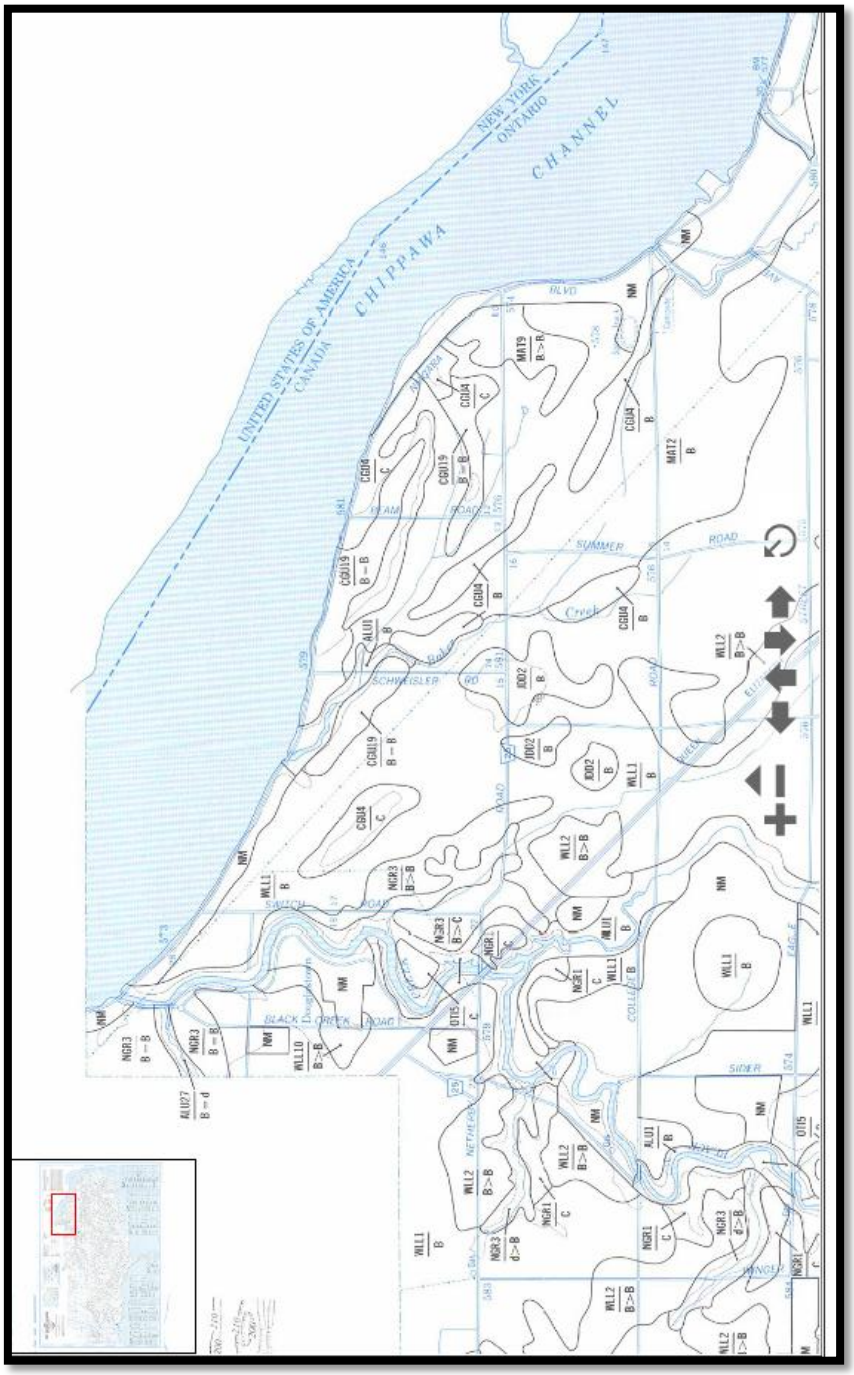


Figure 2

Soil Parameters

Stream Name-Baker's Creek	**Date Sampled**-07/14/2015
Site Number-1-Townline Road	**Date Tested**-07/15/2015
Technicians-AM. Cloutier, TJ. Sferrazza, E. Appleton, J. Villeneuve, T. Coopman, T. Bearss, B. Smalldon	**Texture**-Fine gravel

Soil Parameters	Test results
pH	7.0
Nitrate Nitrogen	10 lb/ac
Phosphorus	200 lb/ac
Potassium	105 lb/ac
Ammonia Nitrogen	Very Low
Calcium	2800 lb/ac
Humus	2
Nitrite Nitrogen	1 ppm

Stream Name-Baker's Creek	**Date Sampled**-07/14/2015
Site Number-2-Sumner Road	**Date Tested**-07/15/2015
Technicians-AM. Cloutier, TJ. Sferrazza, E. Appleton, T. Coopman, J. Villeneuve, T. Bearss, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	8.0
Nitrate Nitrogen	20 lb/ac
Phosphorus	200 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very Low
Calcium	2800 lb/ac
Humus	4
Nitrite Nitrogen	1 ppm

Stream Name-Baker's Creek	**Date Sampled**-07/14/2015
Site Number-3-Schweigler Road	**Date Tested**-07/15/2015
Technicians-AM. Cloutier, T. Coopman, J. Villeneuve, E. Appleton, TJ. Sferrazza, T. Bearss, B. Smalldon	**Texture**-Fine and gravelly

Soil Parameters	Test results
pH	7.2
Nitrate Nitrogen	150 lb/ac
Phosphorus	200 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very Low
Calcium	2800 lb/ac
Humus	5
Nitrite Nitrogen	1 ppm

Stream Name-Baker's Creek	**Date Sampled**-07/14/2015
Site Number-4-Niagara Parkway	**Date Tested**-07/15/2015
Technicians-T. Coopman, J. Villeneuve, TJ. Sferrazza, AM. Cloutier, E. Appleton, T. Bearss, B. Smalldon	**Texture**-Clay/silt

Soil Parameters	Test results
pH	8.0
Nitrate Nitrogen	60 lb/ac
Phosphorus	200 lb/ac
Potassium	220 lb/ac
Ammonia Nitrogen	Very Low
Calcium	2800 lb/ac
Humus	5
Nitrite Nitrogen	1 ppm

Vegetation Inventory

Site 1

Common Name	Binomial Name
Canada goldenrod	*Solidago canadensis*
Knapweed	*Centaurea*
Purple loosestrife	*Lythrum salicaria*
Narrow leaf cattail	*Typha angustifolia*
Buttonbush	*Cephalanthus occidentalis*
Green/Red ash	*Fraxinus pennsylvanica*
Riverbank grape	*Vitis riparia*
Blue vervain	*Verbena hastata*
Spotted jewelweed	*Impatiens capensis*
Gray dogwood	*Cornus racemosa*
Silky dogwood	*Cornus amomum*
New England aster	*Symphyotrichum novae-angliae*
Bittersweet nightshade	*Solanum dulcamara*
Water hemlock	*Cicuta maculata*
Water mint	*Mentha aquatica*
Lady's thumb	*Persicaria maculosa*
White wood aster	*Eurybia divaricata*

Table 4

Site 2

Common Name	Binomial Name
Spotted jewelweed	*Impatiens capensis*
Knapweed	*Centaurea*
Canada goldenrod	*Solidago canadensis*
Japanese honeysuckle	*Lonicera japonica*
Brown-eyed susan	*Rudbeckia triloba*
Black walnut	*Juglans nigra*
Virginia creeper	*Parthenocissus quinquefolia*
Silky dogwood	*Cornus amomum*
Black raspberry	*Rubus occidentalis*
Canada fleabane	*Conyza canadensis*
Riverbank grape	*Vitis riparia*
Highbush cranberry	*Viburnum trilobum*
Bebb's willow	*Salix bebbiana*
Chicory	*Cichorium intybus*
Swamp white oak	*Quercus bicolor*
European buckthorn	*Rhamnus cathartica*
American basswood	*Tilia americana*
Horsetail	*Equisetum arvense*

Table 5

Site 3

Common Name	**Binomial Name**
Pickerelweed	*Pontederia cordata*
Broadleaf arrowhead	*Sagittaria latifolia*
Yellow flag iris	*Iris pseudacorus*
Greater burdock	*Arctium lappa*
Sugar maple	*Acer saccharum*
Red/Green ash	*Fraxinus pennsylvanica*
Freeman's maple	*Acer freemanii*
Bur marigold	*Bidens tripartita*
Common plantain	*Plantago major*
Spotted jewelweed	*Impatiens capensis*
Avens	*Geum*
Wild rose	*Rosa acicularis*

Table 6

Site 4

Common Name	Binomial Name
Staghorn sumac	*Rhus typhina*
White pine	*Pinus strobes*
Slippery elm	*Ulmus rubra*
Canada goldenrod	*Solidago canadensis*
European buckthorn	*Rhamnus cathartica*
Red/Green ash	*Fraxinus pennsylvanica*
Wild rose	*Rosa acicularis*
Riverbank grape	*Vitis riparia*
Common duckweed	*Lemna minor*
Spotted Joe-pye weed	*Eutrochium maculatum*
Broadleaf arrowhead	*Sagittaria latifolia*
White willow	*Salix alba*
Tape grass	*Vallisneria spiralis*
Boneset	*Eupatorium perfoliatum*
Purple loosestrife	*Lythrum salicaria*
Black walnut	*Juglans nigra*
Water lily	*Nymphaea alba*
Japanese honeysuckle	*Lonicera japonica*

Table 7

Phosphates

Date:July 14th, 2015

Site	Phosphates ppm
1) Townline Road	0.66
2) Sumner Road	0.205
3) Schweigler Road	0.795
4) Niagara Parkway	0.055

Table 8

Date: August 5th, 2015

Site	Phosphates ppm
1) Townline Road	DRY
2) Sumner Road	<0
3) Schweigler Road	0.655
4) Niagara Parkway	<0

Table 9

When we first visited Baker Creek in mid-July and tested for phosphates the results ranged from 0.055-0.795mg/L. Although there are no federal or provincial guidelines for phosphate values, the manufacturer of Spectrophotometer, LaMotte state that the value should not exceed 0.1 mg/L. The only site within this guideline was the Parkway. The high phosphate levels could potentially be due to surrounding land being used for residential and agricultural purposes, and being the height of the summer home owners are likely using more fertilizer to maintain their lawns and gardens.

However when we had returned at the beginning of August the phosphate levels had decreased. Two of the sites had readings below zero, while one of our sites had dried up. An area of concern is the site at Schweigler Road, having the highest readings both times at 0.795 & 0.655mg/L. A possible source of contamination at this site could be organic waste from animals, as it backs right off of a farm.

Phosphate levels decreasing and remaining below guidelines is beneficial to our Creeks, as excess phosphate levels can cause eutrophication and algal blooms which decreases oxygen levels in the water and can ultimately lead to the loss of wildlife and vegetation within these systems.

Black Creek

Site Map

Figure 3

Physical Parameters

Date (MM/DD/YYYY):07/27/2015 **Stream Name:** Black Creek

Time: 11:38 am **Location:** Second Concession - Site 1

Technicians: E. Appleton, TJ. Sferrazza, AM. Cloutier,

B. Smalldon, T. Bearss, T. Coopman, J. Villeneuve, A. Levis **Conditions:** Sunny, 22°C

Site Sketch/Photo:

Width:

Wetted Width (m): 9.2	**Bankfull Width (m): 10.4**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
30	50	10	5	**5**

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy √	Description: Swamp milkweed, willows, dogwood, rushes, grasses

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grass, rushes, slight overhang of branches
50	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
16	**0**	**57**	**0**	**9**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Agriculture

-Residential

-Blacksmith

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 11:56 am **Location:** Zavitz Road - Site 2

Technicians: E. Appleton, TJ. Sferrazza, B. Smalldon,

AM. Cloutier, T. Bearss, A. Levis, T. Coopman, J. Villeneuve **Conditions:** Sunny, 23°C

Site Sketch/Photo:

Width:

Wetted Width (m): 8.15	**Bankfull Width (m): 9.34**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
	80	20		

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy √	Description: Rushes, grasses, willows
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Rushes, grasses
75-100	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
11	**0**	**38**	**0**	**16**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Forest

-Agriculture

-Residential

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 12:26 pm **Location:** Point Abino - Site 3

Technicians: E. Appleton, TJ. Sferrazza, AM. Cloutier,

B. Smalldon, T. Coopman, J. Villeneuve, T. Bearss, A. Levis **Conditions:** Sunny, 23°C

Site Sketch/Photo:

Width:

Wetted Width (m): 4.5	**Bankfull Width (m): 5.1**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
		10	90	

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy √	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grasses, rushes
25	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
28.5	**0**	**39**	**0**	**35**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Forest

-Agriculture

-Residential

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 1:30 pm **Location:** Conservation Club - Site 4

Technicians: E. Appleton, TJ. Sferrazza, AM. Cloutier,

T. Coopman, J. Villeneuve, T. Bearss, A. Levis, B. Smalldon **Conditions:** Sunny, 23.5°C

Site Sketch/Photo:

Width:

Wetted Width (m): 5.8	**Bankfull Width (m): 6.2**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
25			50	25

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy √	Description: Grasses, reeds
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grasses, reeds
25	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
10.5	**0**	**44**	**0**	**23**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Conservation Club

-Forest

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 2:10 pm **Location:** Stevensville Road - Site 5

Technicians: E. Appleton, TJ. Sferrezza, T. Coopman,

J. Villeneuve, AM. Cloutier, B. Smalldon, T. Bearss, A. Levis **Conditions:** Sunny, 24°C

Site Sketch/Photo:

Width:

Wetted Width (m): 10	**Bankfull Width (m): 10.4**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
			90	10

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy √	Description: Maples, grasses
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grasses
25	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
20	**0**	**50.5**	**0**	**28**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Town center

-Main streets

-Residential

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 2:26 pm **Location:** Eagle Street - Site 6

Technicians: E. Appleton, TJ, Sferrazza, AM. Cloutier,

J. Villeneuve, T. Coopman, T. Bearss, A. Levis, B. Smalldon **Conditions:** Sunny, 24°C

Site Sketch/Photo:

Width:

Wetted Width (m): 20.9	**Bankfull Width (m): 22.3**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Densely vegetated
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
42.5	42.5	5		

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy √	Description: Trees, grasses, cattails
Open: 0–25% Shaded by canopy	Description:

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grasses, reeds. lily pads, cattails
25	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
28	**0**	**>100**	**0**	**27**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Residential

-Agriculture

-Some small forested sections

Date (MM/DD/YYYY): 07/27/2015 **Stream Name:** Black Creek

Time: 2:43 pm **Location:** Niagara Parkway - Site 8

Technicians: AM. Cloutier, TJ. Sferrazza, E. Appleton,

T. Coopman, J. Villeneuve, T. Bearss, A. Levis, B. Smalldon **Conditions:** Sunny, 24.5°C

Site Sketch/Photo:

Width:

Wetted Width (m): 23.8	**Bankfull Width (m): 23.8**

Riffle or Pool (Riffle = rapid, shallower waters; Pool = slower, deeper waters)**:**

Riffle %: 0	**Pool %: 100**

Bank Stability:

STABLE (Angle > 45˚, non-erodible material / soil) √	Description: Sod and vegetation on banks, fascine, and rip rap
UNSTABLE (Angle > 45˚, (erodible, undercut or bare soil prone to erosion)	Description:
DEPOSITION ZONE (Angle < 45˚ w/gradual slope,(fine sediments)	Description:

Substrate Type (percent clay, silt, sand, gravel or cobble):

Clay % (<.002 mm)	Silt % (.002 - .063 mm)	Sand % (.063 – 2.0 mm)	Gravel % (2.0 – 63 mm)	Cobble % (63 – 200 mm)
25	25		50	

Riparian Cover (on bank within 5m; identify plant species if possible):

Dense: 75–100% shaded by canopy	Description:
Partly Open: 25–75% shaded by canopy	Description:
Open: 0–25% Shaded by canopy √	Description: Trees, grasses, daylilies

Instream Cover (materials that offer "living space" and reduce water speed i.e. undercut banks, rocks, logs, trees, organic debris such as herbaceous stems and algae; 50% = excellent fish habitat):

Instream Cover (%)	Description: Grasses, lily pads
25	

Depth, Hydraulic Head (cm):

Bank "A"		Centre		Bank "B"	
Depth	**H. Head**	**Depth**	**H. Head**	**Depth**	**H. Head**
65	**0**	**>100**	**0**	**65**	**0**

Other (surrounding land use, adverse conditions, correlations with water quality, etc.):

-Niagara Parkway (main street)

-Boat launch

-Residential

-Docks (boats and docks on creek)

Soils

Soil Map

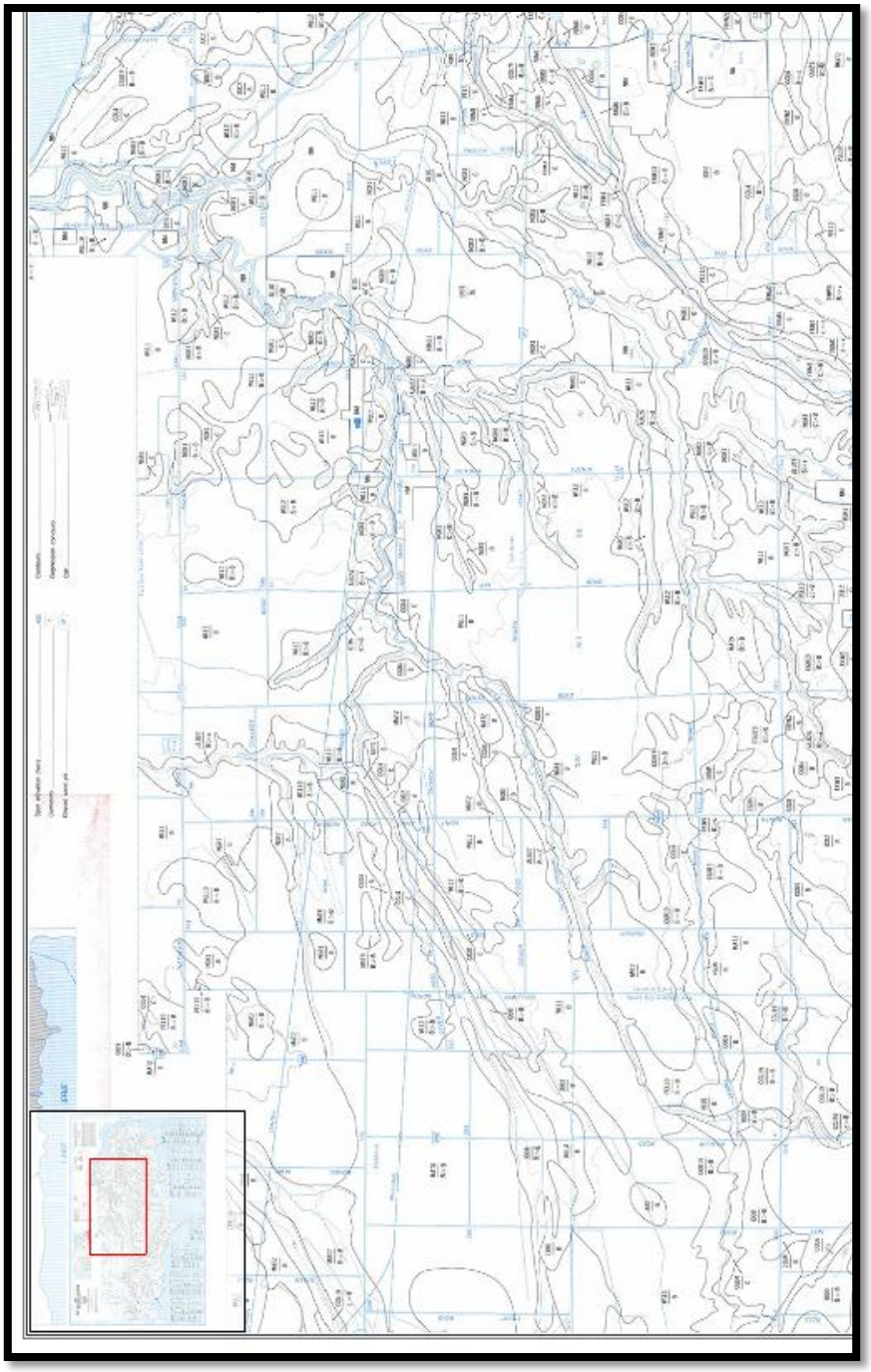


Figure 4

Soil Types

River to convergence:

NM- not mapped

NG3-mainly reddish-hued lacustrine heavy clay

WLL 1-mainly reddish-hued lacustrine heavy clay

OT I 5- mainly reddish-hued lacustrine heavy clay

NGR 1 mainly reddish-hued lacustrine heavy clay -

Convergence to eagle

NM-not mapped

NGR 3- mainly reddish-hued lacustrine heavy clay

WLL 2- mainly reddish-hued lacustrine heavy clay

NGR 1- mainly reddish-hued lacustrine heavy clay

ALU 1-variable floodplain deposits

Eagle to conservation

OTI 5- mainly reddish-hued lacustrine heavy clay

NGR 1- mainly reddish-hued lacustrine heavy clay

ALU 27-variable floodplain deposits

WLL 1- mainly reddish-hued lacustrine heavy clay

NM- not mapped

NGR 8- 15-40 cm loamy textures over mainly reddish-hued lacustrine heavy clay

ALU 24-variable floodplain deposits

Conservation to point abino

CGU 4- mainly reddish-hued clay loam till

MAT 2- 40-100 cm mainly reddish-hued lacustrine heavy clay over clay loam till

ALU 1-variable floodplain deposits

WLL 10- mainly reddish-hued lacustrine heavy clay

NGR 1- mainly reddish-hued lacustrine heavy clay

OID 2-mainly reddish-hued clay loam till

Head to conservation

OID 9-mainly reddish-hued clay loam till

CGU 19-mainly reddish-hued clay loam till

CGU 20-mainly reddish-hued clay loam till

ALU 1-variable floodplain deposits

CGU 4-mainly reddish-hued clay loam till

JDD 8-mainly reddish-hued clay loam till

WLL 8- 15-40 cm peaty material over reddish-hued lacustrine heavy clay

JDD 2-mainly reddish-hued clay loam till

WLL 1- mainly reddish-hued lacustrine heavy clay

LRR 1-organic soil, fen-associated, 40-160cm deep over clayey mineral soil materials (terric-messisol)

Soil Parameters

Stream Name-Black Creek	**Date Sampled**-07/27/2015
Site Number-1-2nd Concession	**Date Tested**-08/04/2015
Technicians-AM. Cloutier, T. Coopman, J. Villeneuve, TJ. Sferrazza, E. Appleton, T. Bearss, B. Smalldon	**Texture**-Clay

Soil Parameters	Test results
pH	6.8
Nitrate Nitrogen	10 lb/ac
Phosphorus	25 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very Low
Calcium	1400 lb/ac
Humus	4
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27/2015
Site Number-2-Zavitz Road	**Date Tested**-08/04/2015
Technicians-T. Coopman, J. Villeneuve, AM. Cloutier, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Clay

Soil Parameters	Test results
pH	7.0
Nitrate Nitrogen	10 lb/ac
Phosphorus	50 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very Low
Calcium	1400 lb/ac
Humus	4
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27/2015
Site Number-3-Point Abino Road N	**Date Tested**-08/04/2015
Technicians-T. Coopman, AM. Cloutier, J. Villeneuve, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	7.2
Nitrate Nitrogen	150 lb/ac
Phosphorus	150 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very Low
Calcium	1400 lb/ac
Humus	5
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27/2015
Site Number-4-Fort Erie Conservation Club	**Date Tested**-08/05/2015
Technicians- T. Coopman, AM. Cloutier, J. Villeneuve, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	6.0
Nitrate Nitrogen	10
Phosphorus	200
Potassium	<100
Ammonia Nitrogen	Very Low
Calcium	2800
Humus	5
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27/15
Site Number-5-Stevensville Road	**Date Tested**-08/4/15
Technicians-T. Coopman, AM. Cloutier, J. Villeneuve, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	6.0
Nitrate Nitrogen	150 lb/ac
Phosphorus	150 lb/ac
Potassium	107 lb/ac
Ammonia Nitrogen	Very low
Calcium	2800 lb/ac
Humus	2
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27,2015
Site Number-6-Eagle Street	**Date Tested**-08/5/15
Technicians- T. Coopman, AM. Cloutier, J. Villeneuve, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	6.0
Nitrate Nitrogen	10 lb/ac
Phosphorus	200 lb/ac
Potassium	300 lb/ac
Ammonia Nitrogen	Very low
Calcium	2800 lb/ac
Humus	5
Nitrite Nitrogen	1 ppm

Stream Name-Black Creek	**Date Sampled**-07/27,2015
Site Number-8-Niagara Parkway	**Date Tested**-08/04/15
Technicians-T. Coopman, AM. Cloutier, J. Villeneuve, T. Bearss, E. Appleton, TJ. Sferrazza, B. Smalldon	**Texture**-Silty clay

Soil Parameters	Test results
pH	7.0
Nitrate Nitrogen	150 lb/ac
Phosphorus	200 lb/ac
Potassium	<100 lb/ac
Ammonia Nitrogen	Very low
Calcium	1400 lb/ac
Humus	5
Nitrite Nitrogen	1 ppm

Vegetation Inventory

Site 1

Common Name	Binomial Name
Queen Anne's Lace	*Daucus carota*
Yarrow	*Achillea millefolium*
Bull Thistles	*Cirsium vulgare*
Teasles	*Dipsacus*
Knapweeds	*Centaurea*
Golden Rod	*Solidago*
Tres Foil	*Trifolium*
Purple Loosestrife	*Lythrum salicaria*
Wild Rose	*Rosa acicularis*
Ash trees	*Fraxinus*
Sow Thistles	*Sonchus*
Swamp Milkweed	*Asclepias incarnata*
Red Clover	*Trifolium pratense*
Common Milkweed	*Asclepias syriaca*
Snake Flowers	*Sansevieria*
Dogwood	*Cornus*
Willows/Salex	*Salix*
Buckthorn European	*Rhamnus*
Plantain-English	*Musa*
Chicory	*Chicorium intybus*

Site 2

Milkweed common	Asclepias syriaca
Teasel	Dipsacus
Chicory	Chicorium intybus
Queen Anne's Lace	Daucus carota
Willow Tree	Salix
Knappweed	Centaurea
Ragweed	Ambrosia artemisifolia
Ladys thumb	Pariscaria maculosa
Ash trees	Fraxinus
Woolgrass	Scirous cyperinus

Site 3

Bull Thistles	Cirsium vulgare
Purple loosestrife	Lythrum salicaria
Dogwood	Cornus
Slippery Elm	Ulmus rubra
Knappweed	Centaurea
Chicory	Chicorium intybus
Golden Rod	Solidago
Riverbank Grapes	Vitis rupestris
Raspberries	Rubis idaeus
Evening Primrose	Oenothera biennis
Milkweed	Asclepias syriaca
Teasel	Dipsacus
Apple Tree	Malus

Site 4

Willow	*Salix*
Dogwood	*Cornus Sericea*
Buckthorn	*Rhamnus*
Slippery Elm	*Ulmus rubra*
Ash	*Fraxinus*
Ragweed	*Ambrosia artemisifolia*
Golden Rod	*Solidago*
Highbush Cranberry	*Viburnum trilobum*
Purple Loosetrife	*Lythrum salicaria*
Bone Set	*Eupatorium perfoliatum*
Burdock	*Arctium lappa*
Nightshade	*Solanum nigrum*
Aster-New England	*Symphyotrichum novae-angliae*
Teasles	*Dipsacus*
Queen Annes Lace	*Daucus carota*
Brown Eyed Susan	*Rudbeckia hirta*
Yarrow	*Achillea millefolium*

Site 5

Golden Rod	*Solidago*
Norway Maple	*Acer platanoides*
Manitoba Maple	*Acer negundo*
Purple Loosestrife	*Lythrum salicaria*
Staghorn Sumac	*Rhus typhina*
Willow	*Salix*
Slippery Elm	*Ulmus rubra*
Milkweed	*Asclepias Syriaca*
Chicory	*Cichorium Intybus*

Site 6

Water docks	*Rumex hydrolapathum*
Flea bane	*Solidago*
Wild rose	*Rosa acicularis*
Chicory	*Cichorium intybus*
Queen Elisabeth lace	*Daucus carota*
White willow	*Salix alba*
Water lily	*Nymphaea*
dogwood	*Cornus sanguinea*
cattails	*Typha latifolia*
Virginia creeper	*Parthenocissus quinquefolia*
Pickerelweed	*Pontederia cordata*
Poison ivy	*Toxicodendron radicans*
Fleabane	*Conyza canadensis*
Manitoba maple	***Acer negundo***
White ash	*Fraxinus americana*
Eggs and butter	*Linaria vulgaris*
burdock	*Acer negundo*
River bank grapes	*Vitis riparia*
arrowhead	*sagittaria*
Golden rod	*Solidago canadensis*
Buckthorn	*rhamnus*
Evening primrose	*Oenothera biennis*
Pickerel weed	*Pontedria cordata*
White oak	*Quercus alba*
Hawthorn	*Crataegus monogyna*
milkweed	*Asclepias syriaca*

site 8

White spruce	*Picea glauca*
Milk weed	*Asclepias Syriaca*
Dogwood	*Cornus sanguinea*
Water docks	*Rumex hydrolapathum*
Flea bane	*Conyza canadensis*
willow	*Salix babylonica*
Primrose	*Primula vulgaris*
Duckweed	*Lemna minor*
Water lillies	*Nymphaea*
Milfoil	*Myriophyllum spicatum*
Daylillies	*Hemerocallis fulva*
Black Walnut Trees	*Juglans nigra*
Freemans Maple	*Acer x freemanii*
Tape grass	*Vallisneria americana*

Sonde Results

Weekly Water Testing Results and Observations

Date: July 13, 2015

Location: Black Creek

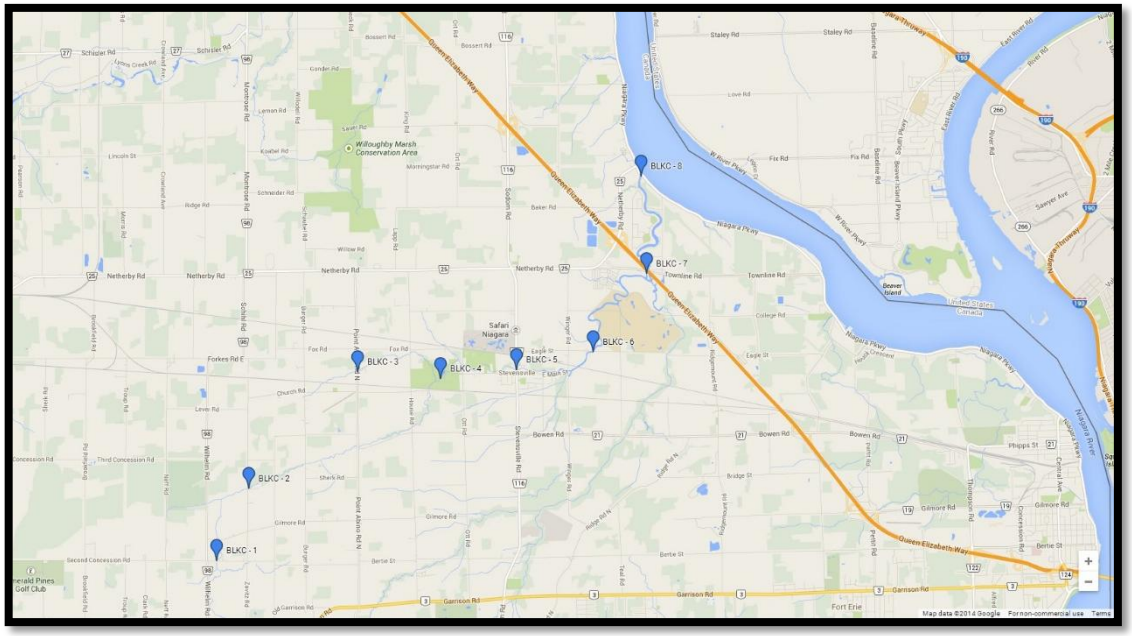
Technician(s): B. Smalldon, A.M. Cloutier, T. Bearss, T. Coopman, J. Villeneuve, E. Appleton, T.J. Sferrazza

Current Weather Conditions:

P.O.P:
Rain:
Wind
Wind gust-
Humidity

Sampling Equipment Used: YSI 6600 V2 Multiparameter Water Quality Sonde

Site Map:



Water Sampling Results:

WEEKLY RESULTS								
SITE	PARAMETERS TESTED / GOVERNMENTAL GUIDELINES							
	Time (24hr.)	Temp. (˚C)	Sp. Cond. (µS/cm)	TDS (g/L)	D.O. (% sat.) / D.O. (mg/L)	pH	CHL – (µg/L) / CHL – (RFU)	Turbidity (NTU)
	N/A	N/A	200 – 1000	0.500	N/A / Warm Water Biota >4 - >7	6.5 - 8.5	2.5 – 8.0 / N/A	≤50
1) 2nd Concession	11:38	25.13	504	.327	62.6 / 5.13	8.62	11.9 / 2.8	67.3
2) Zavitz Road	11:46	20.27	310	.201	18.3 / 1.62	8.06	12.9 / 3.1	18.0
3) Point Abino Road N		22.85	352	.229	44.4 / 3.79	8.07	55.5 / 13.2	88.3
4) F.E.C.C.	12:32	22.72	413	0.268	54.4 / 4.7	8.03	45.6 / 10.6	113.4
5) Stevensville Road		21.78	443	.288	50.3 / 4.4	7.94	34.9 / 8.3	35.5
6) Eagle Street	12:51	23.31	435	.283	50.3 / 4.3	7.84	47.4 / 11.3	30.3
7) Townline Road								
8) Niagara Pkwy.	1:09	22.79	311	2.203	103.6 / 9.1	8.39	3.4 / 0.7	9.4

OBSERVATIONS						
SITE #	Water colour / clarity (i.e. reddish, dark brown, oily film, bottom visible?)	Observed flow (good, minimal, none)	Water level in relation to wetted width (high, average, low – actual depth at centre if possible)	Point source pollution (yes/no, provide description)	Vegetation (density, diversity, and health; name species if possible)	Wildlife (species and abundance)
1) 2nd Concession	Brown	Minimal/none	Average	Right on farm	Lots of water, grasses sparse, 1m buffer	Bullfrogs
2) Zavitz Road	Brown cloudy	None	Average	No	Raspberries, dense grasses	Tadpoles Fish
Rusty brown	Rusty brown	None	Average/ low	No	Raspberries, dense grasses	Birds
4) F.E.C.C.	Brown	Good	Average	Train Outhouse	Dense, diverse vegetation	Birds
5) Stevensville Road	Brown	Minimal	Average	City cars/main road Underground pipe outlet	Moderate/ dense	
6) Eagle Street	Brown	Minimal	Good/ average	No	Wild rose Good buffer Open dense	Dragonfly Turtle
7) Townline Road						
8) Niagara Pkwy.	Green	Good	Average	Motor boats	Sparse willows, lilies, sumac	

Weekly Water Testing Results and Observations

Date: July 21st, 2015

Location: Black Creek

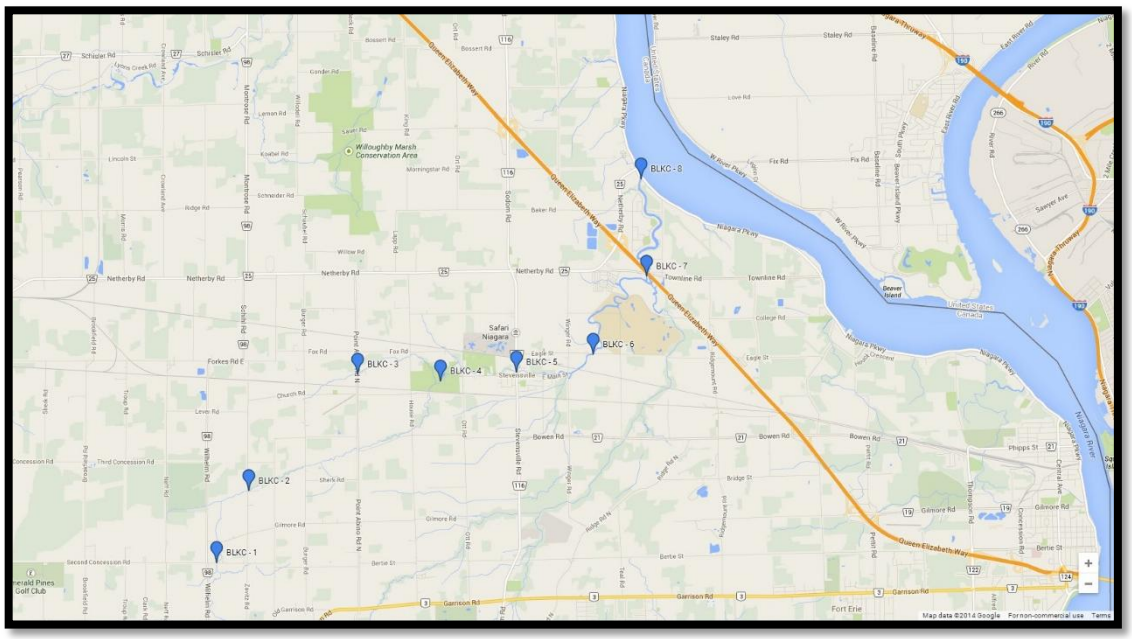
Technician(s): J. Villeneuve, T. Coopman, T. Bearss, E. Appleton, T.J. Sferrazza, B. Smalldon

Current Weather Conditions:

P.O.P:
Rain:
Wind
Wind gust-
Humidity

Sampling Equipment Used: YSI 6600 V2 Multiparameter Water Quality Sonde

Site Map:



Water Sampling Results:

WEEKLY RESULTS								
SITE	PARAMETERS TESTED / GOVERNMENTAL GUIDELINES							
	Time (24hr.)	Temp. (˚C)	Sp. Cond. (µS/cm)	TDS (g/L)	D.O. (% sat.) / D.O. (mg/L)	pH	CHL – (µg/L) / CHL – (RFU)	Turbidity (NTU)
	N/A	N/A	200 – 1000	0.500	N/A / Warm Water Biota >4 - >7	6.5 - 8.5	2.5 – 8.0 / N/A	≤50
1) 2nd Concession	1:27	24.26	422	.275	44.7 / 3.72	8.34	33.3 / 7.9	79.9
2) Zavitz Road	1:46	22.55	437	.284	29.5 / 2.53	8.06	10.2 / 2.5	9.4
3) Point Abino Road N	2:01	25.30	366	.238	37.2 / 3.02	7.93	55.9 / 13.4	76.2
4) F.E.C.C.	2:18	25.37	530	.344	62.7 / 5.13	7.98	35.9 / 8.6	101.8
5) Stevensville Road	2:41	25.24	517	.336	61.7 / 5.07	8.04	29.9 / 7.0	37.9
6) Eagle Street	2:50	28.19	494	.321	69.3 / 5.51	7.98	34.7 / 8.2	21.9
7) Townline Road								
8) Niagara Pkwy.	3:05	23.56	324	.211	93.4 / 7.91	8.32	4.2 / 0.9	12.8

OBSERVATIONS						
SITE #	Water colour / clarity (i.e. reddish, dark brown, oily film, bottom visible?)	Observed flow (good, minimal, none)	Water level in relation to wetted width (high, average, low – actual depth at centre if possible)	Point source pollution (yes/no, provide description)	Vegetation (density, diversity, and health; name species if possible)	Wildlife (species and abundance)
1) 2nd Concession	Reddish brown No bottom visibility	No flow	Average	Same as previously	Same as previously	School of baby catfish
2) Zavitz Road	Reddish brown Some bottom visibility	No flow	Average	Same as previously	Same as previously	Tadpoles
3) Point Abino Road N	Reddish brown No bottom visibility	No-low flow	Average	Same as previously	Same as previously	Lots of insects (mosquitoes, flies, dragonflies, damselflies)
4) F.E.C.C.	Cloudy, rusty colour Some bottom visibility	Low flow	Average	Same as previously	Same as previously	Dragonflies Damselflies
5) Stevensville Road	Reddish brown No bottom visibility	Low flow	Average	Same as previously	Same as previously	Dragonflies Damselflies
6) Eagle Street	Reddish brown No bottom	Low flow	Average	Same as previously	Same as previously	Dragonflies Damselflies
7) Townline Road						
8) Niagara Pkwy.	Clearish Good bottom visibility	Some flow	Average	Same as previously	Same as previously	Dragonflies Damselflies

Weekly Water Testing Results and Observations

Date: July 27th, 2015

Location: Black Creek

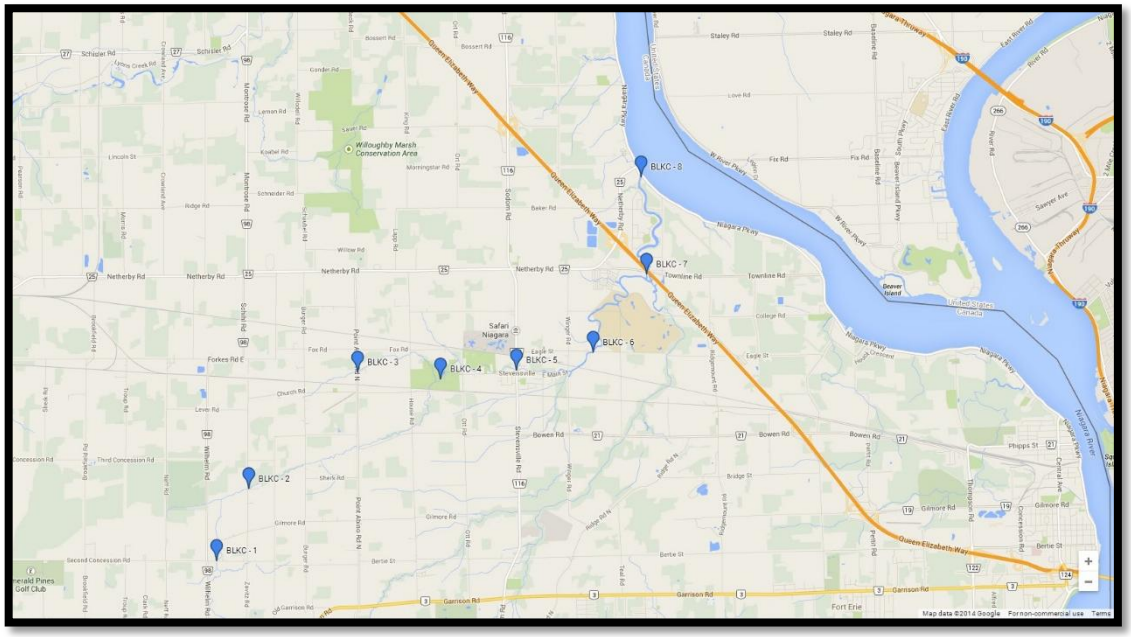
Technician(s): E. Appleton, T. Bearss, A.M. Cloutier, T. Coopman, A. Levis, T.J. Sferrazza, B. Smalldon, J. Villeneuve

Current Weather Conditions:

P.O.P:
Rain:
Wind
Wind gust-
Humidity

Sampling Equipment Used: YSI 6600 V2 Multiparameter Water Quality Sonde

Site Map:



Water Sampling Results:

WEEKLY RESULTS								
SITE	PARAMETERS TESTED / GOVERNMENTAL GUIDELINES							
	Time (24hr.)	Temp. (˚C)	Sp. Cond. (µS/cm)	TDS (g/L)	D.O. (% sat.) / D.O. (mg/L)	pH	CHL – (µg/L) / CHL – (RFU)	Turbidity (NTU)
	N/A	N/A	200 – 1000	0.500	N/A / Warm Water Biota >4 - >7	6.5 - 8.5	2.5 – 8.0 / N/A	≤50
1) 2nd Concession	11:34	25.78	444	.289	71.1 / 5.79	8.43	14.6 / 2.5	6.7
2) Zavitz Road	11:56	21.26	469	.242	28.8 / 2.54	7.90	13.9 / 3.3	11.4
3) Point Abino Road N	12:23	21.96	386	.251	25.6 / 2.22	7.90	51.6 / 12.3	106.1
4) F.E.C.C.	1:30	21.53	543	.353	47.1 / 4.15	7.77	36.8 / 8.8	88.1
5) Stevensville Road	2:00	23.76	574	.373	52.7 / 4.45	8.08	30.4 / 7.2	19.7
6) Eagle Street	2:16	27.66	517	.336	44.1 / 3.46	7.96	19.5 / 4.6	25.4
7) Townline Road								
8) Niagara Pkwy.	2:41	25.26	319	.207	103.2 / 8.46	8.27	3.1 / 0.7	10.6

OBSERVATIONS						
SITE #	Water colour / clarity (i.e. reddish, dark brown, oily film, bottom visible?)	Observed flow (good, minimal, none)	Water level in relation to wetted width (high, average, low – actual depth at centre if possible)	Point source pollution (yes/no, provide description)	Vegetation (density, diversity, and health; name species if possible)	Wildlife (species and abundance)
1) 2nd Concession	Brown	None	Average	Pasture	0-25%	Damselflies Baby leopard frogs Dragonfly
2) Zavitz Road	Brown	None	Average	Agriculture	50-75%	Painted turtle Baby leopard frogs Coyote scat Monarch larvae on milkweed Minnows Cedar waxwings
3) Point Abino Road N	Brown	None	Average		25-50%	Water striders American goldfinch Cabbage whites Rough-winged swallows
4) F.E.C.C.	Brown	Minimal	Average		50-75%	Spicebush swallowtail American goldfinches Grey catbird
5) Stevensville Road	Brown	Minimal	Average	Busy road Businesses	50-75%	
6) Eagle Street	Brown	Minimal	Average	Train nearby	25-50%	Minnows Variety of birds
7) Townline Road						
8) Niagara Pkwy.	Green	Good	Average	Boats Homes Traffic	0-25%	Zebra mussels Leeches

Weekly Water Testing Results and Observations

Date: August 11, 2015

Location: Black Creek

Technician(s): AM. Cloutier, E. Appleton, TJ. Sferrazza, J. Villeneuve, T. Coopman

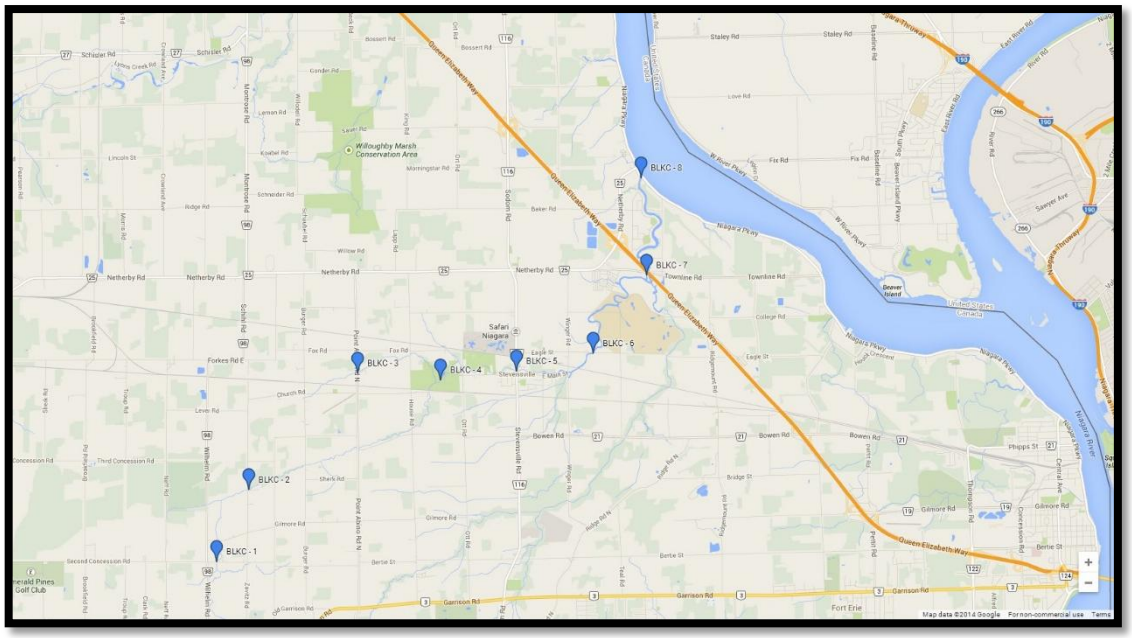
Current Weather Conditions:

Partly sunny, 22°C

Rain:27.2mm

Sampling Equipment Used: YSI 6600 V2 Multiparameter Water Quality Sonde

Site Map:



Water Sampling Results:

WEEKLY RESULTS								
SITE	PARAMETERS TESTED / GOVERNMENTAL GUIDELINES							
	Time (24hr.)	Temp. (˚C)	Sp. Cond. (µS/cm)	TDS (g/L)	D.O. (% sat.) / D.O. (mg/L)	pH	CHL – (µg/L) / CHL – (RFU)	Turbidity (NTU)
	N/A	N/A	200 – 1000	0.500	N/A / Warm Water Biota >4 - >7	6.5 - 8.5	2.5 – 8.0 / N/A	≤50
1) 2nd Concession	12:11	20.87	972	.633	34.5 / 3.06	8.39	17.5 / 4.2	60.2
2) Zavitz Road	12:20	19.24	529	.344	15.0 / 1.34	7.77	24.6 / 5.7	99.7
3) Point Abino Road N	12:31	18.79	638	.415	38.2 / 3.54	7.80	46.6 / 11.1	77.7
4) F.E.C.C.	12:43	22.16	521	.338	58.1 / 5.1	7.99	35.6 / 8.5	173.2
5) Stevensville Road	12:53	21.12	557	.361	54.1 / 4.8	7.97	23.8 / 5.7	41.4
6) Eagle Street	1:02	21.52	556	.361	35.3 / 3.1	7.82	17 / 4.1	37.3
7) Townline Road								
8) Niagara Pkwy.	1:12	23.18	281	.183	106 / 9.06	8.59	-0.9 / -0.2	2.0

OBSERVATIONS						
SITE #	Water colour / clarity (i.e. reddish, dark brown, oily film, bottom visible?)	Observed flow (good, minimal, none)	Water level in relation to wetted width (high, average, low – actual depth at centre if possible)	Point source pollution (yes/no, provide description)	Vegetation (density, diversity, and health; name species if possible)	Wildlife (species and abundance)
1) 2nd Concession	Brown, murky	Minimal	Average	Agriculture	Open 0-25%	Insects - Crickets Dragonflies Butterflies
2) Zavitz Road	Murky, oily, brown	Minimal	Average		Dense 50-75%	Frogs Crickets Birds
3) Point Abino Road N	Brown, darker than previous site	Minimal	Average	Ditch Agriculture	25-50%	Crickets Butterflies Birds
4) F.E.C.C.	Brown, milky	Minimal	Average		50-75%	Birds Insects
5) Stevensville Road	Brown, thick	Minimal	Average	Traffic Residential	75-100%	Crickets
6) Eagle Street	Brown, oily surface	Minimal/good	Average		25-50%	Frogs Crickets Birds
7) Townline Road						
8) Niagara Pkwy.	Green	Good	Average	Boats Traffic Residential	25-50%	

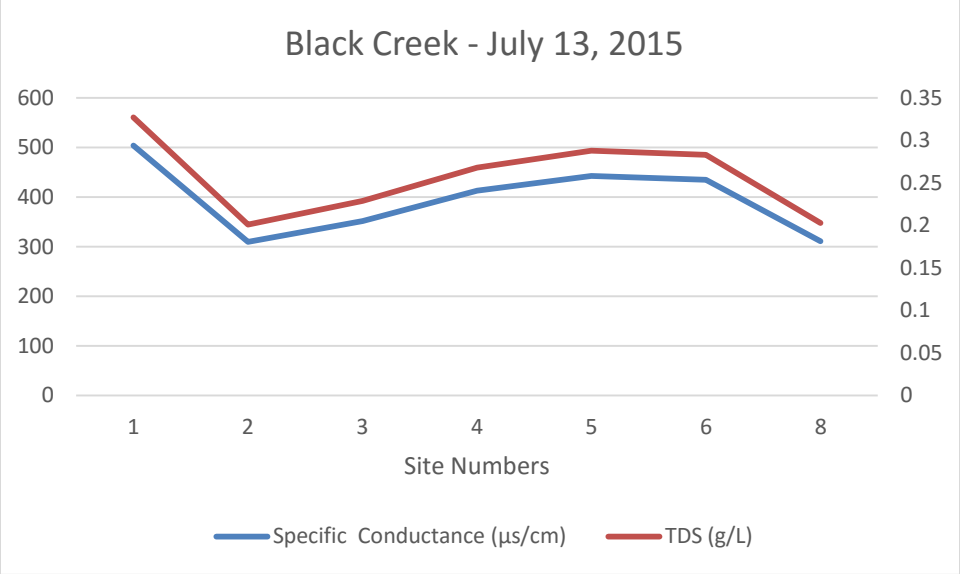
Phosphates

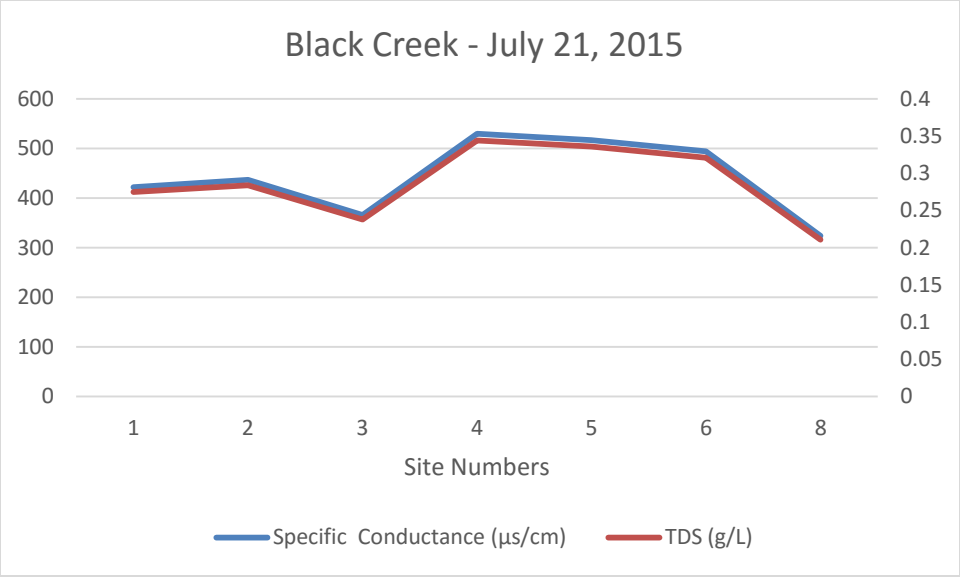
Date: July 22nd, 2015

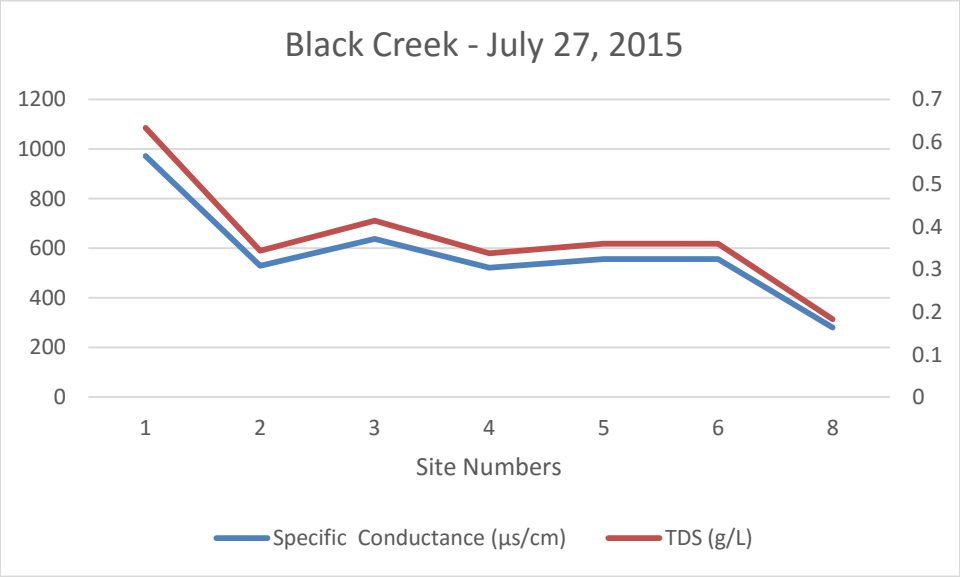
Site	Phosphates ppm
1) 2nd Concession	0.17
2) Zavitz Road	0.875
3) Point Abino Road	<0
4) F.E.C.C.	<0
5) Stevensville Road	<0
6) Eagle Street	<0
7) Townline Road	
8) Niagara Parkway	0.365

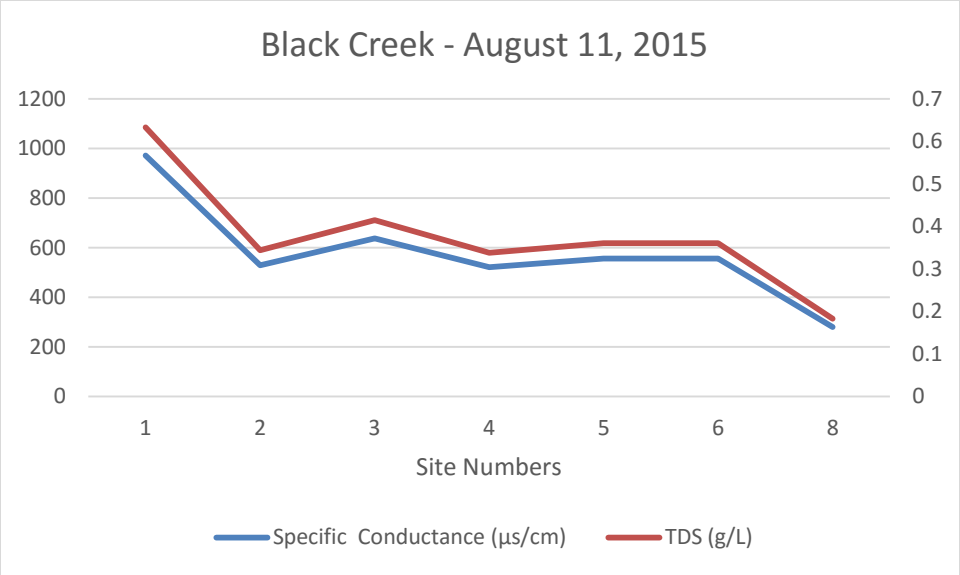
TDS and Conductivity

Conductivity is the measurement of water's ability to carry an electric charge, and is directly related to the amount of total dissolved solids (TDS) within that water. The ions carrying the electrical charge come from inorganic salts such as calcium, bicarbonates, potassium, sodium, chlorides, sulfates as well as organic matter. The TDS in the samples we collected throughout the summer were likely from natural sources like minerals and salts in the water, and urban run-off from residential and agricultural properties. When these ions are dissolved in water they break down into cations and anions, producing positive and negative charges. The more of these ions and charges present in the water, the higher the conductivity and TDS measurements. When conductivity measurements are relatively high (>1000uS/cm) it typically indicates a problem within the system, such as an over-abundance of inorganic salts, or possibly pollution. However, TDS and conductivity are typically higher during the spring and early summer due to the large amounts of snow melting and run off being produced, as turnover has not occurred and the water has not had a chance to dilute itself yet. This is why it is important to monitor the parameters of our local water systems throughout the year, to ensure that everything balances out and there are no abnormal measurements indicating pollution within the area.




Black Creek - July 21, 2015
600
500
400
300
200
100
0
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
2
3
4
5
6
8
Site Numbers
Specific Conductance (µs/cm)
TDS (g/L)


Black Creek - July 27, 2015
1200
1000
800
600
400
200
0
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
8
Site Numbers
Specific Conductance (µs/cm)
TDS (g/L)


Black Creek - August 11, 2015
1200
1000
800
600
400
200
0
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
8
Site Numbers
Specific Conductance (µs/cm)
TDS (g/L)

Benthos Biomonitoring

A biological study was attempted along Black Creek, however following the proper Ontario Benthos Biomonitoring Network protocol was near impossible. The creek is actually an old dredged out drainage system and has no real natural creek features. There are no real riffle/pool sequences, very few natural meanders, and it is mostly all open canopies. The substrate is also less than ideal for benthic habitat. The results were very difficult to attain, however some benthos were retrieved. The following table shows the results and based on what was found, it can be assumed that the water system has a moderate level of pollution regularly.

Site	**Results**
2- Zavitz Road	• **1 Isopod (Sow bug)** • **9 Decapoda (Crayfish)**
3- Point Abino Road	• **1 Oligochaeta (Aquatic earthworm)** • **1 Hirundinea (Leech)** • **10 Decapoda (Crayfish)** • **8 Hemiptera (True bugs)**
4-Fort Erie Conservation Club	**Nothing was attained from this site**

Other Interesting Information

Giant Hogweed (Heracleum mantegazzianum)

The giant hogweed is non-native to our Ecosystem in Ontario. The weed is aggressively moving into our habitat and taking over resources such as water, space, sunlight and nutrients from the ground. This invasive species causes harm to human health and causes environmental damage.

Description

The giant hogweed is native to the Mountains in Southwest Asia. It is a perennial plant and is also member of the carrot family. Although there are several ways that invasive species get transported, the giant hogweed was introduced as an ornamental plant to Ontario back in 1949. It is scattered throughout Ontario and has reached as high up as Kapuskasing. It was listed as a provincially noxious weed in 2010 (Ontario Invasive Plants Council, 2007).

The white flower of the giant hogweed appears in mid-June. The head of the flower can measure up to 1 m across. The hogweed can be identified by its stem. It's thick and hollow stem, can grow up to 5.5 meter in height and 5-15 cm in diameter. It has a noticeable purple or blotchy purple stem with coarse, bristly hairs. When the stem is broken, it will release a clear watery sap.

Habitat

In its native range the giant hogweed grows in meadows, ravines and along forest edges and streams. In Ontario it is found in riverbanks, streams, wetlands, open woodlands, ditches and roads. It prefers moist soils and full sunlight and is tolerant to our cold climate.

Health Hazards

The health concern for the giant hogweed is the clear, water sap that is released after the stem is broken. The sap contains toxins that can cause severe dermatitis. Severe burns and painful blisters will appear after touching the sap. Exposure to sunlight can make the burns and blisters more painful. Sensitivity can last for years after being exposed to the sap (Ontario's Species Awareness Program, 1992). If you do come in contact with the sap from the giant hogweed, you are to wash the area well with soap and water and go see your doctor.

Wildlife or grazing animals are not interested in eating this weed for the same reasons you don’t want to have the sap on your skin. The giant hogweed is a rapid grower in the early season

and it shades out our native plants, taking away food from grazing animals and wildlife. It is also creeping into farmers' fields which are adding more cost to your grocery bill. The more the farmer has to deal with this invasive plant the more your grocery bill goes up. There has been no extensive research on its impact in Ontario or Canada. Nonetheless the giant hogweed is in the United Kingdom. It grows in similar places as wetlands and streams. What it is doing is increasing erosion to the banks of the streams causing rocks and soil to fall into the stream. This erosion threatens the spawning of salmon. This may also occur in Ontario.

The Ministry of Natural Resources recommends hiring a professional exterminator to remove the giant hogweed from your property. If you see it in the wild, you can contact the Invading Species Awareness Program at 1-800-563-7711 or visit their website www.invadingspecies.com. As you can see this invasive species not only harms just the plants and animals living in the ecosystems, but is also a threat to human health. Therefore if you think it is giant hogweed, stay away from it.

Norway maple (Acer platanoides)

History

The Norway maple is native to Europe. It was introduced to North America as an ornamental tree in the 1700's. It is naturalized in British Columbia, southern Ontario and east to Newfoundland. It is sold by many nurseries still today.

Features

The Norway maple can grow up to 18-21 m. The leaves are opposite, simple deciduous with 5-7 palmate lobes. The leaves are dark green to purple and are maple shaped. The stem of the leaf secretes a milky sap when broken. The Norway flowers are greenish yellow and approximately 1 cm across. The flower can be bisexual or male. The wings of the seeds are widely spread to assist with wind dispersal. The trunks are straight with dark grey bark

Impact

The Norway maple growing season starts in early spring and drops its leaves in late fall. This aids the Norway maple to outcompete native species with a longer growing season. Native trees are less tolerant of shade as the Norway maple. The dense shade along with shallow

roots of the Norway maple prevents native tree seedlings from establishing in our natural forests. Plants and grass will not grow beneath the Norway tree. This is why it has been designated as an invasive species.

Control

Cutting the tree down and applying a few applications of herbicide to the stump will prevent it from growing back. The same herbicide should be used on the seedlings and young saplings.

Berries in Ontario

Bearberry

- The bearberry has a very thick skin and is very soft and dry.
- The berries can be ground into porridge.
- Warning: may cause nausea or constipation when eaten in quantity.

Black Currant

- Berries contain seeds which are dense in nutrients.
- If eaten raw the berries tend to be tart.
- The plant is small, grows up to 1-2 m tall.
- The leaves and stem of the plant has a very strong aroma.
- Warning:may cause stomach cramps if eaten in quantity.

Black Huckleberry

- The Black Huckleberry is sweeter than red huckleberry .
- The berry is Very high with vitamin C.
- Grow in forests and mountainous areas.

Blackberry

- When berry is fully grown its taste is very sweet.
- The berry can be dried for storage.
- Berry stem may form thorns.

Blueberry

- When the berry is fully grown its taste is very sweet.
- the berry can be dried for storage.
- the juice from berry can be boiled and cooled to make a jelly.
- Blueberries grow in both wooded and open moist areas.

Bunchberry

- berry has a very mild taste.
- berry has a very hard crunchy seed, which is edible.
- berry can be found in foothills forest regions
- warning: unripe berries can cause stomach cramps

Hazardous Materials

In Fort Erie there are many people that will litter in this and when all that get into our creeks it can kill our animals and can affect our water and its quality. There are many things that can affect the water and animals, there is gas, garbage, plastic and other self ware devices. I think out of all of the things that could affect anything would be plastic, it is the worst thing that has affected us and it never goes and if we burn the stuff we hurt mother earth, and if we try and bury it and try to let it slow break down, that won't work because it affects our soil and our growth of trees and plants. Plastic is the most affecting material that we have ever produced. I think our main problem should be taking out all plastic and cleaning our oceans and land. Once we get rid of plastic we will have better waters for us to drink.

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