



207 Woolwich Street  
Guelph, Ontario  
Canada, N1H 3V4

Phone (519) 780-1107  
Fax (519) 780-1748  
e-mail: [truenorth@t nec.ca](mailto:truenorth@t nec.ca)  
URL: [www.t nec.ca](http://www.t nec.ca)

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Sarah Mainguy, M.Sc.  
North-South Environmental  
35 Crawford Cres. P.O. Box 218  
Campbellville, Ontario  
L0P 1B0

**RE: A Fisheries Assessment of Howitt Creek, Guelph Ontario.  
True North Project Number 05023**

Dear Ms. Mainguy,

The following letter report provides an assessment of fisheries resources in Howitt Creek, Guelph, Ontario. This fisheries assessment was completed in support of a proposed commercial development in the vicinity of Howitt Creek. The information provided herein may be incorporated into an EIS (Environmental Impact Study) completed in support of a proposed commercial development on the subject lands. The location of the subject lands and Howitt Creek are shown in Figure 1. The purpose of the fisheries assessment was to identify constraints related to fisheries issues and evaluate the sensitivity of the fisheries resources.

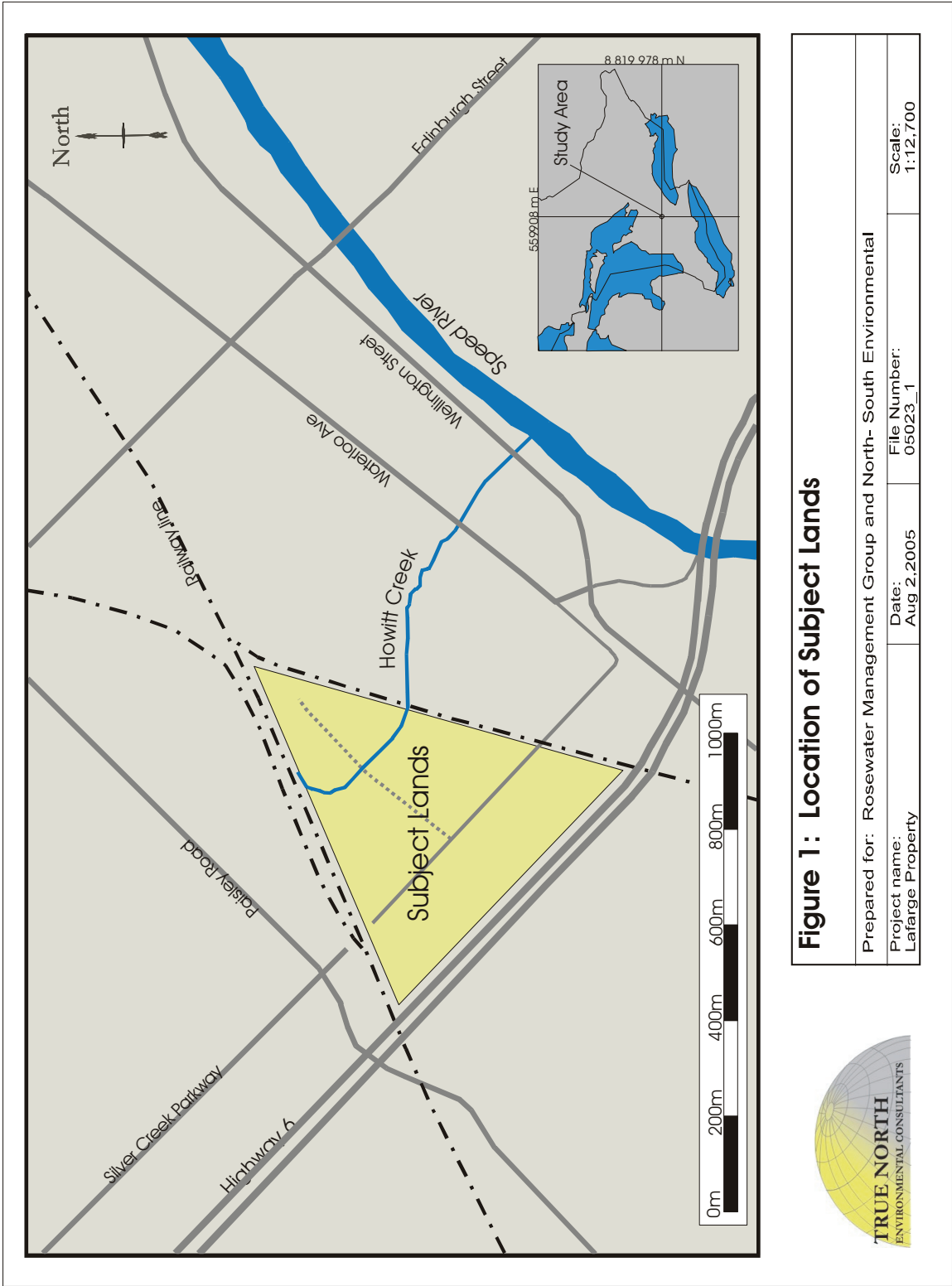
**Methods**

Fish habitat descriptions found in this report are based on a fish habitat assessment conducted on July 27, 2005. The fish habitat assessment was conducted over the entire length of Howitt Creek from the mouth at the Speed River upstream to where the creek originates at a large storm sewer. For the purpose of describing fish habitat, the stream was divided into reaches of similar habitat. Within each reach, qualitative observations were made pertaining to the following fish habitat features:

- Instream cover;
- Bank stability;
- Substrate composition;
- Stream morphology;
- Wet Width;
- Channel Width;
- Barriers to fish movement;
- Aquatic vegetation;
- Riparian vegetation; and,
- Canopy cover.

*In-situ* measurements of pH, temperature and conductivity were recorded in each reach.

One reach (Reach 4) was located on the subject lands. Within this reach, a more quantitative estimate of wet width and channel width were obtained by taking width measurements at six transects located at regular intervals along the watercourse.



**Figure 1: Location of Subject Lands**



Prepared for: Rosewater Management Group and North- South Environmental	
Project name: Lafarge Property	File Number: 05023_1
Date: Aug 2,2005	Scale: 1:12,700

To determine thermal regime, one temperature logger was placed in the watercourse, and another temperature logger was attached to a tree adjacent to the watercourse. Both temperature loggers were located in the shade, and recorded temperature at 30-minute intervals from July 27, 11:30 am through August 8, and 12:30 PM. The results section of this letter report compares surface water temperatures to corresponding air temperatures. The fish community observed was also used to determine thermal regime.

Fish community descriptions were based on a fisheries inventory conducted on August 05, 2005. The inventory was conducted using a backpack electrofisher using a single pass method to determine the fish species utilizing the study area and their relative abundance. The Ministry of Natural Resources, and Grand River Conservation Authority were contacted to obtain historical data for this site; however, no fisheries information was provided by these agencies.

### **Fish Habitat**

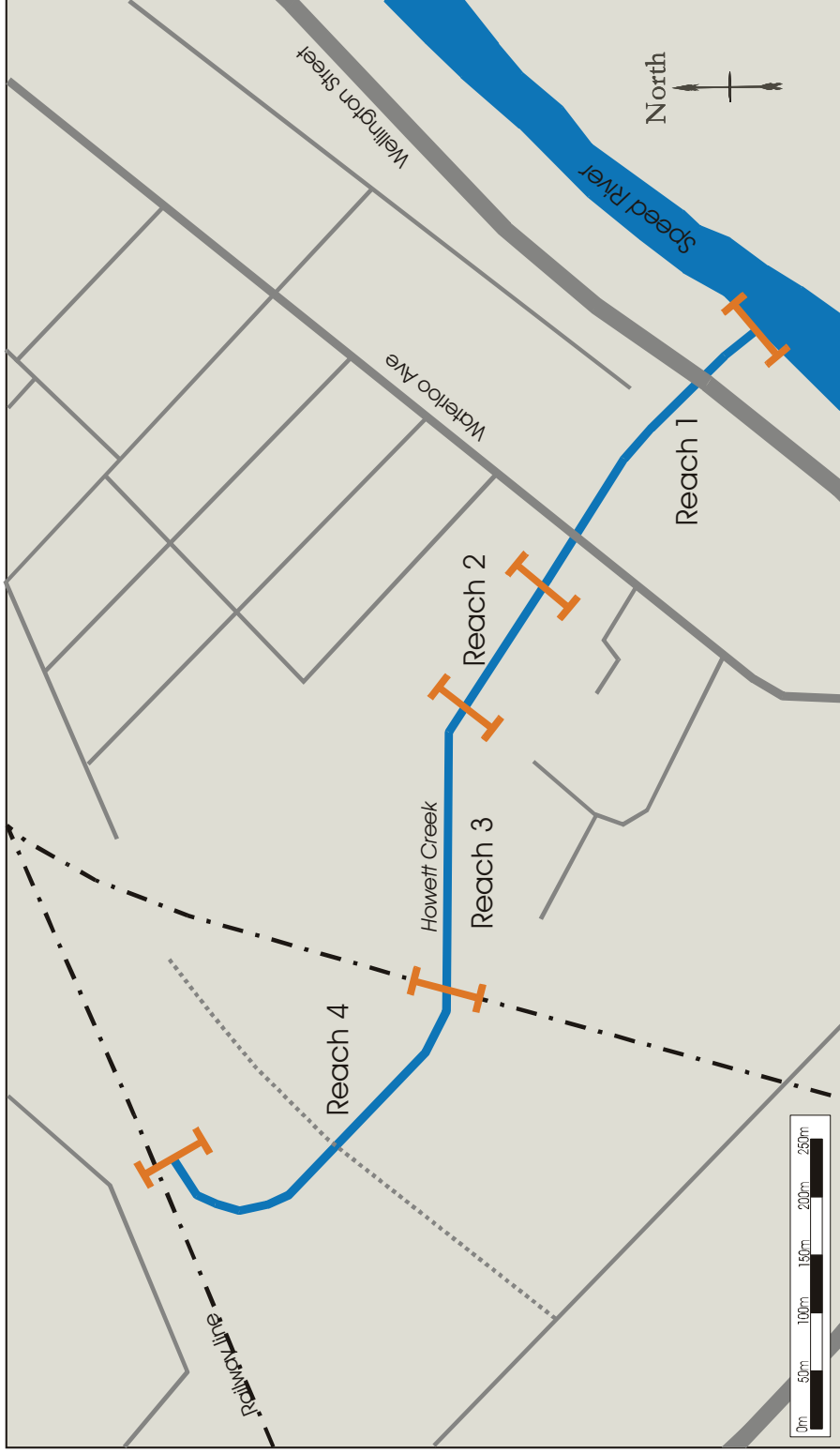
Overall, fish habitat in Howitt Creek was found to be severely degraded due to past land use practices throughout the watershed. Immediately upstream of the subject lands, the upper portion of the watershed has been urbanized, and the stream channel is now an enclosed storm sewer. Within the subject lands, flash flows, instream waste concrete, and a perched twin culvert have adversely influenced the natural morphology of the watercourse. An old dam was observed downstream of the subject lands, which is a barrier to fish passage. Farther downstream, the watercourse has been chanelized straight, and long sections of the watercourse flowed underground through concrete storm sewers. The lower portion of the watershed contains several barriers to fish passage. Despite the severely altered nature of this watercourse, some areas of fair fish habitat were present. Although a chemical analysis of the water was not conducted, poor water quality may also be a factor limiting the use of this watercourse by some fish species. Based on qualitative observations made on July 27 and Aug 5, 2005, the flow regime of Howitt Creek is believed to be permanently flowing, year round.

Howitt Creek was found to contain four reaches of similar habitat. These reaches were labeled 1 through 4, from downstream to upstream, and are discussed individually in the following text. The locations of the four reaches are shown in Figure 2. A summary of fish habitat features for each reach is provided in Table 1. Photographs are provided as an attachment to this letter report.

#### Reach 1

Reach 1 was located from the mouth of Howitt Creek upstream for a distance of 280 metres. This reach had been chanelized straight in the past, with long sections of vertical concrete banks (Photo 1). Near the mouth of Howitt Creek, a large vertical drop over a concrete ledge created a barrier to upstream fish passage (Photo 2). A similar barrier was also present just upstream of Wellington Street (Photo 3). Long sections of this reach flowed through closed bottom box culverts under Wellington Street and Waterloo Ave. These culverts did not contain natural substrates, and may inhibit upstream fish passage during high flows.

A variety of substrates were present in Reach 1 including cobble and boulder with some sand. Stream morphology was predominantly run, but some riffle and deep pool was also present. There was fairly good riparian canopy through parts of Reach 1, while riparian vegetation was predominantly grass in the lower section.



**Figure 2: Reach Breaks delineating Stream Reaches of Similar Habitat.**



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Project name: Lafarge Property		Date: Aug 2,2005	File Number: 05023_2
		Scale:	1:5,070

Table 1: Summary of fish habitat measurements and observations.

	Reach 1	Reach 2	Reach 3	Reach 4
<b>Date</b>	August 5, 2005	August 5, 2005	August 5, 2005	August 5, 2005
<b>Time</b>	8:52 am	9:27 am	9:49 am	10:37 am
<b>Air temperature (°C)</b>	19	20	21	23
<b>Water temperature (°C)</b>	18.6	17.7	17.8	16.8
<b>pH</b>	8.00	8.07	7.86	7.99
<b>Conductivity</b>	1494	1424	1064	1083
<b>Water clarity</b>	slightly turbid	slightly turbid	slightly turbid	slightly turbid
<b>Water colour</b>	grey/green tinge	grey/green tinge	grey/green tinge	grey/green tinge
<b>In-stream cover</b>	deep pool, boulder, Undercut concrete walls, tree roots	deep pool, boulder	Deep pool, root mass, woody debris	Deep pool, root mass, overhanging shrubs and boulder
<b>Bank stability</b>	20% stable 5% vulnerable 5% eroding 70 % protected	40% stable 10% vulnerable 20% eroding 30 % protected	20% stable 15% vulnerable 60% eroding 5 % protected	40% stable 25% vulnerable 25% eroding 10 % protected
<b>Substrate composition</b>	concrete, cobble and boulder with some sand	cobble and boulder	Sand and gravel with some cobble	Sand, gravel cobble and clay with some boulder
<b>Stream morphology</b>	15 % riffle 75 % run 10 % pool	80 % riffle 15 % run 5 % pool	40 % riffle 40 % run 20 % pool	15 % riffle 75 % run 10 % pool
<b>Wet width (m)</b>	2.5	3.0	2.0	1.8
<b>Bank full width (m)</b>	6	6	4	4.0
<b>Average depth (m)</b>	0.20	0.10	0.15	0.15
<b>Maximum pool depth (m)</b>	0.75	0.40	0.45	0.60
<b>Barriers (to upstream movement)</b>	3 complete	1 complete	none	1 partial
<b>Aquatic vegetation</b>	none	none	emergent - common	none
<b>Riparian vegetation</b>	deciduous trees & shrubs	mature deciduous	wetland plants & mature deciduous	deciduous trees & shrubs
<b>Canopy cover</b>	25% open 65% closed 10% partly open	0% open 95% closed 5% partly open	40% open 60% closed 10% partly open	05% open 75% closed 20% partly open
<b>Flow regime</b>	permanent	permanent	permanent	permanent
<b>Thermal regime</b>	cool water	warm water	warm water	warm water
<b>Photograph numbers</b>	DSCN3018 – DSCN3027	DSCN3010 – DSCN3017	DSCN2993 – DSCN3009	DSCN2963 – DSCN2992

Note: Date and time correspond to when water and air temperatures were recorded.

## Reach 2

Reach 2 was located upstream of Waterloo Ave (from the old dam, downstream for approximately 90 metres). The stream gradient in this area was fairly steep (approximately 3 %), and substrates consisted mostly of large cobble and boulder. There was a dense canopy cover through most of this reach provided by mature deciduous trees. Boulders and a few deep pools provided cover in this reach. Photographs 4 and 5 show typical habitat of Reach 2.

## Reach 3

Reach 3 was located from the dam, upstream to a railway crossing located at the south edge of the subject lands. This reach was approximately 280 metres in length. Stop logs from the old dam have been removed, and the watercourse has carved a channel through the old reservoir bed (Photo 6). In this area, the meander pattern of Howitt Creek was sinuous and a good mixture of riffle, run and pool habitats were present. The riparian vegetation in the lower part of this reach was predominantly wetland vegetation, which provided little canopy cover (Photo 7). The upper half of this reach contained many mature willow trees, which provided good canopy cover. The root structures of these willow trees also provided cover, along with deep pools, and woody debris. Substrates in this reach were a mixture of sand and gravel with some cobble.

Garbage and woody debris accumulating in this area created debris jams, which inhibited water flow, and caused water to back up in some areas (Photo 8).

## Reach 4

Reach 4 was approximately 340 metres in length and was located on the subject lands (from the railway along the southern property line to the railway along the northern property line). The surface watercourse originated at a large storm sewer at the upstream end of Reach 4 (Photo 9). Refuse in the riparian vegetation above the stream was indicative of very high, flashy flows coming from the storm sewer network (Photo 10). Many large pieces of concrete and steel were observed in the watercourse throughout Reach 4. A perched concrete culvert created a barrier to upstream fish passage in the middle of this reach (Photo 11).

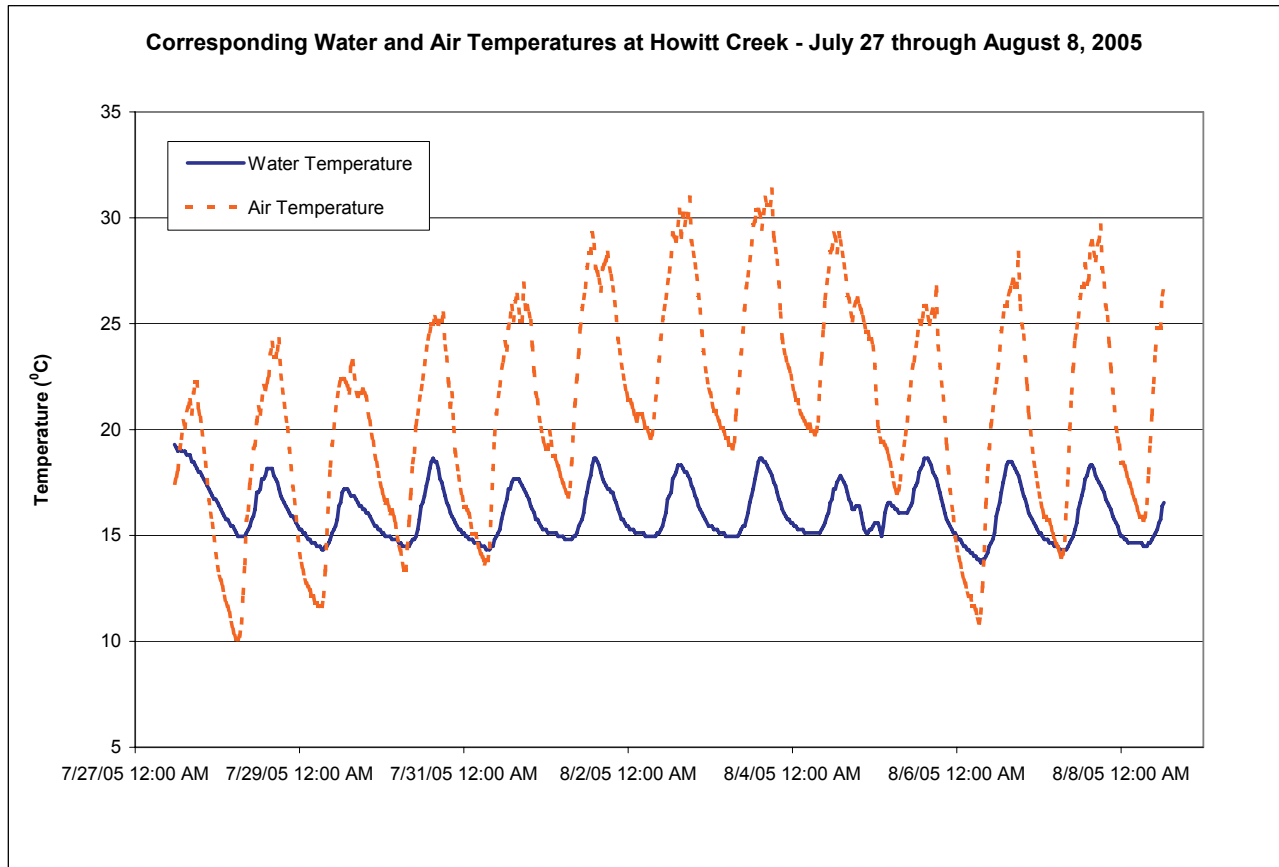
Although there was some sinuosity to the channel in this reach, it appears as though this section of the watercourse had been chanelized in the past (Photo 12). Stream morphology was predominantly run, with some riffle and deep pool. These pools provided good cover, along with overhanging shrubs, root structures and sporadic boulders. Riparian trees and shrubs provided good canopy cover through most of Reach 4. Substrates were comprised of a mixture of sand, gravel, cobble and some boulders.

## Thermal Regime

Temperature loggers placed in Reach 4 revealed a cool water thermal regime. While air temperatures ranged from 10.09°C to 31.34°C, water temperatures ranged from 13.71°C to 19.29°C during the same time period. Mean air temperature between July 27 and August 8 was 21.11°C, while the mean water temperature for that same period was 16.08°C. Figure 3 shows corresponding air and water temperatures measured in Reach 4 from July 27 through August 8, 2005. Based on the temperature data collected, Howitt Creek can be classified as having a cool water thermal regime.

Although water temperatures were cool, cold water fish species were not observed in the Howitt Creek, nor is it likely that cold water species could survive in Howitt Creek.

Figure 3: Corresponding air and water temperatures measured in Reach 4 from July 27 through August 8, 2005.



### Fisheries Inventory

A total of 219 fish consisting of nine different species were caught during our electrofishing survey on August 5 2005. Catch results and electrofishing effort are summarized in Table 2. A single pass method was used in each reach, with the exception of Reach 2, where two passes were made. An effort was made to expend equal fishing effort in all habitat types.

One hundred and thirty two fish consisting of nine species of fish were caught in the lower end of Reach 1, which has a direct connection to the Speed River. All of the fish from Reach 1 were caught below the furthest downstream fish movement barrier. Some of the deeper pools in this area likely provide important refuge habitat to young of the year species such as white sucker and small mouth bass. Numerous young of the year fish of these two species were caught in the lower reach of Howitt Creek. Above the barriers in Reach 1, far fewer fish were caught. No fish were caught in Reach 2. Reaches 3 and 4 supported only creek chub (*Semotilus atromaculatus*). Catch per unit effort was low in all three reaches upstream of Reach 1.

All of the fish species known to inhabit the study area are common warmwater species, and none are listed as species of concern by COSEWIC (Committee on the Status of Endangered Wildlife in Canada).

**Table 2: Catch per unit effort and abundance of various fish species captured in Howitt Creek - August 5<sup>th</sup>, 2005.**

Scientific Name	Common Name	Reach 1	Reach 2	Reach 3	Reach 4	Totals
<i>Catostomus commersonii</i>	white sucker	40	0	0	0	40
<i>Cyprinus carpio</i>	common carp	7	0	0	0	7
<i>Etheostoma nigrum</i>	johnny darter	9	0	0	0	9
<i>Micropterus salmoides</i>	smallmouth bass	4	0	0	0	4
<i>Phoxinus eos</i>	northern redbelly dace	3	0	0	0	3
<i>Pimephales promelas</i>	fathead minnow	14	0	0	0	14
<i>Rhinichthys atratulus</i>	longnose dace	3	0	0	0	3
<i>Rhinichthys cataractae</i>	blacknose dace	3	0	0	0	3
<i>Semotilus atromaculatus</i>	creek chub	49	0	75	12	136
	Total number of fish	132	0	75	12	219
	Total number of species	9	0	1	1	9
Total electrofishing effort (seconds)		371	602	595	766	2334
Catch per Unit Effort (fish captured per minute)		21.3	0.0	7.6	0.9	5.6

### Discussion/Recommendations

Flash flows and barriers to upstream fish movement have adversely affected fish habitat, which is reflected in the low diversity of fish species found throughout the watercourse, upstream of the furthest downstream barrier. However, some fairly good quality fish habitat is present in some parts of Howitt Creek.

There are few constraints related to fisheries, however, the existing ecological function of Howitt Creek should be maintained. This may be accomplished by:

- ✓ Maintaining existing riparian vegetation to a distance of 15 metres from the centerline of the stream, for a vegetated buffer strip totaling 30 metres in width.
- ✓ Preventing further degradation of water quality through a comprehensive storm-water management plan.
- ✓ Measures should be taken to prevent the entry of silt into the watercourse during construction.

It is not yet known if final development plans will require the realignment of the existing watercourse. Due to the highly degraded nature of the watercourse, and the previous channel realignments, relocating the stream channel (should this be necessary) is not expected to have any significant effects on the productive capacity of the fisheries resource. In fact, there are many opportunities for fish habitat enhancement in the event that the proponent wishes to relocate the existing channel. It is important to note that fish habitat compensation or enhancement works may only be required if the existing watercourse channel is altered or relocated. Possible opportunities for on-site habitat enhancement include:

- ✓ Construction of storm-water management facilities to buffer existing flash flows. This may be considered for the upstream end of the subject lands to buffer flash flows coming from storm sewers upstream of the subject lands.
- ✓ The feasibility of including wetland filtration as a part of storm water management may be explored.

- ✓ Reconstructing the existing channel using principals of natural channel design to create meanders and enhance habitat diversity. This may be accomplished at several locations on-site, where the existing channel has been straightened.
- ✓ Removal of barriers or creating means for fish to bypass barriers would greatly enhance the productive capacity of the watercourse. Although most of the impassable barriers exits downstream of the subject lands, there is a fish barrier at the existing twin concrete culverts in the middle of the subject lands. This barrier could be easily removed during the construction of road crossings over the watercourse.
- ✓ Removal of in-stream refuse, and placing cobble and gravel in strategic locations to enhance substrate diversity.

## Summary

In July and August of 2004, a fisheries inventory and fish habitat assessment was conducted in Howitt Creek, Guelph Ontario. This fisheries assessment was completed in support of a proposed commercial development in the vicinity of Howitt Creek. Fish habitat was found to be severely degraded due to past land use practices throughout the watershed, although some areas did provide fair fish habitat. A total of 219 fish consisting of nine different species were caught in Howitt Creek during our electrofishing survey. However, only one species was caught upstream of Wellington Road. All of the fish species known to inhabit the study area are common warmwater species, and none are listed as species of concern by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). Based on the temperature data collected, Howitt Creek can be classified as having a cool water thermal regime.

Constraints to development included maintaining the existing riparian corridor, and preventing further degradation of water quality. However, due to the highly degraded state of the watercourse, relocating the channel, should it be required, is not expected to have a significant negative effect on the productive capacity of the fisheries resources of Howitt Creek; provided adequate mitigation and compensation measures are employed. Opportunities for fish habitat enhancement, if the stream is re-aligned, include the creation of storm-water management facilities for existing flash flows, removing barriers to fish migration and creating more natural channel in the event that the channel is relocated.

Thank you for the opportunity to work with you on this important project. If you have any questions or comments, please call.

Sincerely,

Mike Johns

Terrain and Water Resources Technologist  
**True North Environmental Consultants**  
207 Woolwich Street,  
Guelph, Ontario  
N1H 3V4