

Mill Creek Stewardship Rangers

Final Report 2015



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1.0 Introduction

Mill Creek is a coldwater, low gradient stream that flows 30km across the southern Ontario landscape. The creek's headwaters originate north of the Village of Aberfoyle and flow southwest towards the City of Cambridge eventually reaching its confluence with the Grand River. Mill Creek traverses through some of Ontario's richest gravel and sand deposits. Therefore, a large proportion of the creek's annual discharge is generated by inputs of local groundwater.

The Mill Creek watershed is unique for several reasons. Most of the riparian corridor adjacent to the creek and its many tributaries remains heavily forested. The dense canopy cover minimizes the amount of solar radiation reaching the ground's surface. This influences the degree to which the adjacent recharge zones can retain and supply cold water to the creek. Mature trees along the bank also shade the channel from solar radiation, thus preventing excess warming during the summer. Water temperatures stay cold enough throughout the summer to maintain the required dissolved oxygen concentrations needed to support brown and brook trout populations. Conversely groundwater upwellings during the winter provide warmer water temperatures (relative to the air), which produce favourable conditions for fish spawning and egg development.

The *Friends of Mill Creek (FoMC)*, a community based organization initiated the Mill Creek restoration effort in 1997 following the completion of the Mill Creek Subwatershed Study. The *FoMC* actively work with private land owners within the watershed to gain access to the creek. In 2003, the *FoMC* founded the Mill Creek Stewardship Ranger program - a group of four highschool summer students and a crew leader responsible for carrying out environmental restoration projects within the watershed. Funding for the program is donated by many generous companies and individuals within the Mill Creek watershed.

Historically, highway construction, agriculture and different land use practices have played a role in negatively altering the natural behaviour of the creek. Due to Mill Creek's close proximity to growing population centers, land use activities will continue to threaten the health of the creek. On-going conservation of the surrounding forested wetlands coupled with stewardship ranger restoration activities will be essential for future success conserving and enhancing this diverse ecosystem.

The 2015 ranger crew worked for a total of eight weeks (June 29th to August 21st) and were successful in carrying out a number of environmental restoration projects. A detailed summary of this year's work is outlined in the following report.

Mill Creek Stewardship Ranger Crew of 2015



Photo 1 - Rangers from left to right; Drew Huggins, Adam Riggi, Mitch Walker, Sam Neumann and Evan De Melo

Crew Leader:

Adam Riggi: Cambridge resident

GRCA Support:

Crystal Allan: Natural Heritage Supervisor

Robert Messier: Ecologist

Crew Members:

Drew Huggins: Guelph Resident

Mitch Walker: Cambridge Resident

Sam Neumann: Guelph Resident

Evan De Melo: Cambridge Resident

2.0 Health & Safety Training

The Rangers attended several presentations to inform and prepare them for the potential hazards of the workplace.

GRCA Health and Safety Orientation

GRCA's Natural Heritage Supervisor, Crystal Allan provided the Rangers with a half-day presentation covering the organization's commitment to a safe work place. A brief overview of the GRCA's operations was covered along with the *Occupational Health and Safety Act* and the *Workplace Hazardous Materials Information System (WHMIS)*. Emphasis was placed on personal protective equipment, heat stress symptoms, hazardous plants identification and concerns when working in and around water.

First Aid, AED and CPR Awareness

The Rangers attended a half-day First Aid training course held at GRCA's corporate auditorium. An instructor from *Workplace Medical Corp* taught the Rangers how to respond to emergency situations using a variety of proper techniques. Upon the completion of the course, the Rangers were awarded a one-year level C certificate.

3.0 Work Sites

A variety of tasks were accomplished at several locations across the Mill Creek subwatershed including channel debris removal and modifications, habitat creation, and the removal of material restoration materials, such as T-bars, that were no longer required to secure previous restoration efforts.

Lake's Farm Property

This site has experienced a tremendous amount of restoration effort over the past decade. Prior to Ranger restoration, a dam had been built downstream of the Lake's property for agricultural purposes. During the course of the dam's existence many of the stream's physical conditions were altered: elevated water levels extended upstream and caused the channel to widen; flow velocities decreased causing an increase in sediment deposition; and trees that were once growing above the water surface became submerged resulting in a large number of trees falling into the streambed perpendicular to the direction of flow.

The dam was removed in the early 1990's, however many environmental impacts are still evident. The large logs that remain in the streambed prevent the unobstructed flow of the stream. Logs that lay perpendicular to the flow, force the stream outwards and redirects the channel's energy. A wider shallower channel contributes to the deposition of finer sediments and these finer sediments smother gravel substrate which is vital habitat for fish and macrobenthic species. Altered flow regimes and widened channels also impact natural meander patterns and reduce riffle and pool features. Riffles and pools are vital components of the aquatic ecosystem because they represent the physical conditions needed to support a diverse community of species. Since 2007, the Rangers have worked to remove the large woody debris from the streambed and have re-arranged that material into strategic locations providing new habitat and re-establishing a more natural meander pattern. Efforts at this property have been successful in transitioning the stream back towards a more natural state.

This summer the Ranger crew spent a total of 12 days at the Lake's property, hiking 750m into the site, with all their equipment. After inspecting last year's work, the group was immediately tasked with removing several logjams using hand saws, peavey poles and muscle to divide the woody material into lengths that were suitable to move by hand. The crew was able to successfully remove the impediments and used the woody material to create 5 large structures over the course of 90m. Once built, the 5 structures were secured into place using a total of 50 earth anchors and 4 rolls of malleable fencing wire weaved through the structures to prevent any future movement.

The Ranger's were able to work quite efficiently and their progress exceeded expectations. The vast majority of the crew's summer was spent at this location and by the end of August the Rangers were very skilled at building structures.

Modifications

It is difficult to predict the exact outcome of any restoration effort. Therefore, it is critical to assess work from last year to make sure that the structures are still fulfilling their desired functions. Two structures from last year needed to be modified.

Modification # 1

The deflector seen in photo 2 was built to push the thalweg left of center looking upstream. It was noticed that water was flowing around the base of the structure and supplying a channel behind the deflector chosen to be cut off last year. Photo 3 demonstrates the Rangers' work this year to combine cedar foliage and logs to block off the flow to help stabilize the area and encourage the appropriate deposition of sediment. **(Red arrow indicates landmark)**



Photo 2 - Structure from last year



Photo 3 - Structure after modification

Modification # 2

Since last year, the area behind the deflector in photo 4 experienced a great deal of sediment accumulation. To encourage further sediment deposition in this area, a new structure was built (photo 5). It's anticipated with time a more continuous stream bank will establish to maintain the narrowing channel profile.



Photo 4 - Structure from last year



Photo 5 - Structure after modification

New Structure #1

The first logjam cleared by the crew (Photo 6) was located between structures 1 and 2. Most of the logs had fallen perpendicular to the stream and forced the channel to flow very wide. The Rangers cleared all of the submerged logs, some of which had diameters of greater than 30cm. Once all of the debris was removed, the new thalweg could be observed. The stream immediately began to cut a narrower and deeper channel profile making it easier to distinguish the thalweg and an estimation of where to position structure 1 could be made. The sweeper structure was constructed to protect the bank from erosion, to promote deposition of sediment and to provide habitat. Material was used from the cleared logjam and cedar foliage was gathered to create the structure. After the installation of structure 1, the crew noticed that the substrate adjacent to the structure had changed. The once sandy and silty substrate was flushed downstream, uncovering the gravel substrate. The Rangers also observed changes in water depth within the channel and a well-defined pool and riffle section was observed upstream and downstream of the structure.



Photo 6 - Logjam removed by the rangers (numbers represent the relative locations of where structures were built).



Photo 7 – Location of structure #1



Photo 8 - Structure #1 completed



Photo 9- Upstream end of structure #1



Photo 10 - Upstream end of structure #1 completed

New Structure #2

Removing the first logjam resulted in significant changes upstream. The section of stream between structures 1 & 2 narrowed dramatically (photos 11 and 12). The crew planned on constructing a deflector upstream of structure 2 which would re-direct flow downstream. Anticipating an increase in flow velocity, the Rangers built a sweeper structure to protect the stream bank from erosion (photo 13). The active channel width was reduced by 50% and encouraged the transport of sediment downstream. Initially most of the substrate in the work area was sandy and the channel depth was less than 15cm. Within a week the channel depth deepened to approximately 70cm towards the upstream end of structure 2 (photo 17).



Photo 11 - View looking upstream before logjam removal



Photo 12 - Channel response to removal of first logjam



Photo 13 - Full view of structure 2

Before and after photos of strucutre 2:



Photo 14 - Location of structure 2 before debris removal



Photo 15 - Structure 2 completed



Photo 16 - Upstream end of structure 2



Photo 17 - Upstream end completed

New Structure #3

A wide and braided channel is not the natural channel type for the reach of Mill Creek flowing through the Lake's property. Photo 18 is an example of how a blockage can disrupt the natural meander pattern of a stream. Since there were two active channels present, the Ranger crew had to evaluate which channel to block off. The Ranger Crew decided to direct the stream channel left of center (photo 18) by installing a deflector structure to block off the undesired channel.

By the time the crew had reached the location for the construction of structure 3, most of the woody debris from the first logjam had been incorporated into the first two structures. The Rangers were able to collect enough material from the streambed and surroundings to build a large enough structure capable of diverting the stream channel. The large deflector structure re-established a more natural meander pattern and cut the cross-sectional channel width by 50% (Photo 22). The thalweg responded to the efforts and a defined channel began to carve its way towards structure 2. Sediment has begun to accumulate behind the base of structure 3 and with time the area should resemble a riparian area and not an active channel.



Photo 18 - Braided channel looking downstream before restoration



Photo 19 - Channel forced to flow towards structure 2

Before and after photos for structure 3:



Photo 20 - Right hand side of braided section looking downstream



Photo 21 - Structure 3 completed



Photo 22 - Natural meander pattern

New Structures #4 & #5

With all of the downstream structures constructed and secured, the Rangers tackled another formidable logjam (photo 23). They were able to remove the logjam in a single day during a joint work-day with the Ontario Ministry of Natural Resources and Forestry Stewardship Rangers. Predicting which way to divert the stream was made easier by consulting the downstream meander pattern already established.



Photo 23 - Logjam upstream of structure 3

The Ranger crews built a deflector and a sweeper structure; their locations can be seen in Photo 24. Structure 4 was a sweeper structure built to help narrow the channel and provide habitat.

Structure 5 was a deflector structure aimed towards narrowing and changing the direction of flow. Structure 5 was challenging to build for several reasons. The stream was fairly deep so a substantial amount of material was used to effectively push the channel towards structure 4.



Photo 24 – Locations of structure 4 and 5

Reduce the cross sectional channel width by 50%. The area behind structure 5 is no longer part of the active channel and sediment has already begun to accumulate (photo 30).

The substrate adjacent to structures 4 and 5 was slower to respond. However, by the end of the summer almost all the sand had been transported downstream and most of the substrate found in the area was gravel. This section exhibits one of the most well defined pool and riffle sequences.

An electrofishing demonstration at the end of August confirmed the value of the new habitat created. The Ranger crew was able to catch on camera a large brown trout jumping away from structure 5 (photo 29).

Before and after photos for structure 4:



Photo 25 - Location of structure 4



Photo 26 - Structure 4 completed

Before and after photos for structure 5:



Photo 27 - Location of structure 5

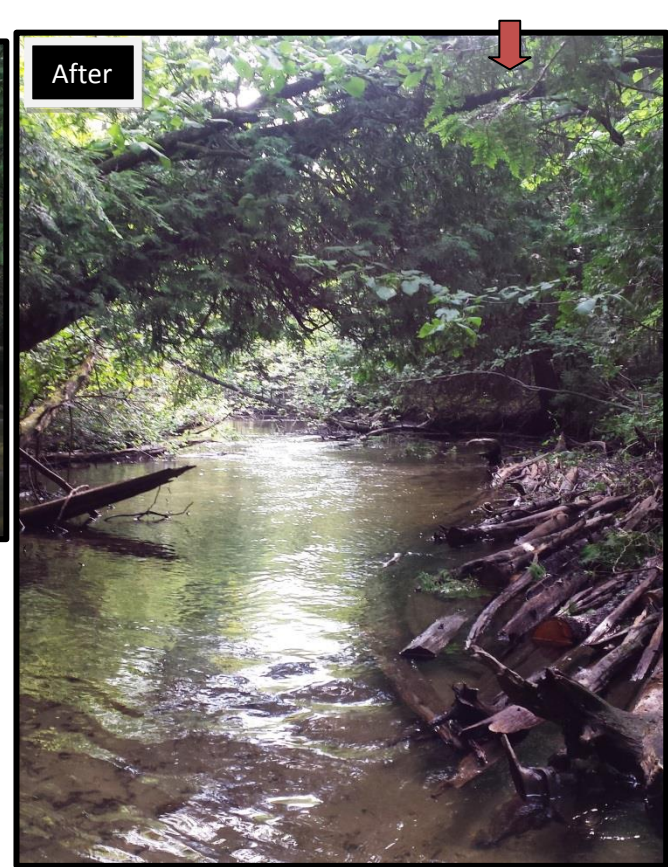


Photo 28 - Structure 5 completed

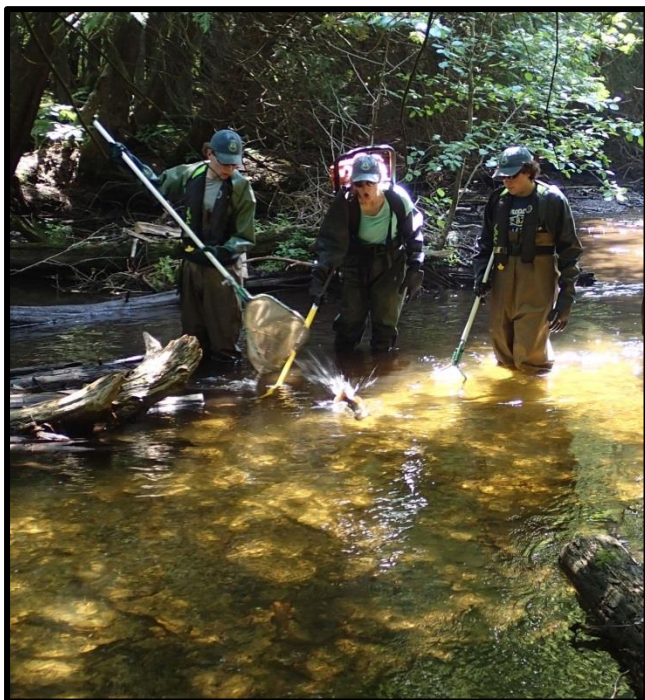


Photo 29 - Electrofishing structure 5



Photo 30 - Sediment accumulation behind structure 5

Wozniak's Farm Property

The Mill Creek Stewardship Rangers were kindly invited back by the property's owner and steward, as she was quite happy with the work done by last year's crew. Historically, McCrimmon Creek has been negatively impacted by local landuse changes and development. The creek is a tributary to Mill Creek and provides the system with many positive benefits. Like much of the watershed, McCrimmon Creek flows through heavily forested wetlands which influence even colder water temperatures than Mill Creek. Temperatures are cold enough to support a brook trout population throughout the summer. Tributaries with brook trout are valuable because they can potentially be a local population source to supply the main channel of Mill Creek with brook trout once conditions become favourable.

The first step at this property was to inspect the work done by last year's crew and it was noted that most of the woody debris installed last year had moved. This year's objective was to improve the location of the woody debris placed in the stream and secure it properly. This was accomplished by re-positioning the material back into strategic locations that would provide habitat for the brook trout. With permission, freestanding dead cedar trees, approximately 5cm in diameter, were cut to lengths of roughly 75cm. Cedar stakes were driven into the ground in front of the newly placed debris in order to prevent the logs from floating away. It took the crew 2 full days to modify the entire 350m of stream that was cleared by last year's crew. Photos 31-34 demonstrate the modifications:



Photo 31



Photo 32

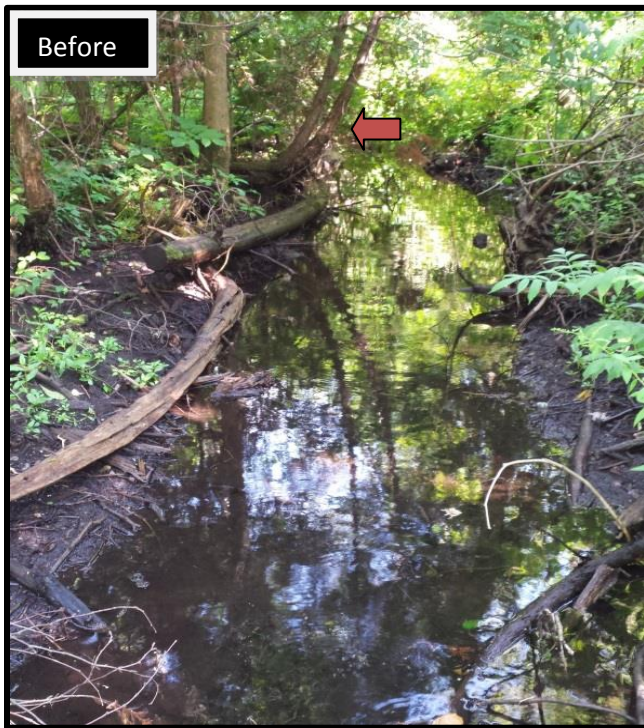


Photo 33



Photo 34

Bond Tract

Even before the Mill Creek Stewardship Ranger Program had been founded, members of the GRCA were carrying out Mill Creek restoration activities at the Bond Tract property. Prior to earth anchor technology, it was common to use steel T-bars to secure deflector and sweeper structures. The T-bars at this location had served their purpose and it was time for their removal. As the structures were now established, there was no concern about them failing because most of the woody debris and sediment deposition had naturalized. However many T-bars now stuck out of the water and posed a potential hazard to anglers and hikers. The T-bars also looked very foreign within the landscape.



Photo 35 - Typical section of creek with T-bars



Photo 36 - Rangers building a raft to transport T-bars



Photo 37 - Rangers transporting T-bars downstream towards the truck

The rangers traversed 450m of stream and removed 135 T-bars by hand. Due to the weight and the long distance back to the road, the crew improvised and decided to build a raft to float them out. Dry cedar logs were cut from the surrounding forest and nailed together using large spikes. The raft was approximately 1m x 2m and was able to successfully hold 200lbs of T-bars. In total it took 3 full days to remove all the T-bars from the site.

Beaver Dam Removals

Dufferin Aggregate Pit and the Heritage Lake residential community were two additional properties identified in the Rangers' summer workplan. At both locations, beavers had built dams across the entire Mill Creek channel resulting in the impoundment of water. Although beaver activity is a natural phenomenon within the Mill Creek watershed, the dams had to be removed for monitoring purposes. Flow gauges, temperature monitors and groundwater measuring devices are located in these areas in order to collect data. Industry and regulatory bodies in the region rely on these data to quantify any potential influences industries may be having on the environment. Beavers had raised the water level approximately 80cm above the dams at both locations.

Dufferin Pit Beaver Dam and Debris Removal

It took 2 days to remove the dam completely. The first day 50% of the material was removed and the crew had to make sure to do so evenly across the top of the dam to prevent a failure. A week later, the Rangers returned when the water levels had dropped which allowed the removal of the remainder of the dam. Most of the sticks were intricately woven together and it was quite difficult to dismantle. The sticks were displaced up on shore away from the dam location so it would not be easy for a beaver to resemble.

Before and after photos for Dufferin beaver dam and debris removal:



Photo 38 - Beaver dam



Photo 39 - Stream flowing freely after removal of beaver dam



Photo 40 - Water level surface with dam present



Photo 41 - Water level surface with dam removed

Debris removal and habitat improvements were also assessed downstream of the dam. A smaller debris pile was dismantled and rearranged towards the right hand side of the stream. This allowed sediment to be carried downstream and the new structure provided habitat.



Photo 42 - Debris pile downstream of the beaver dam



Photo 43 - Debris pile removed, re-used to build structure to the right (in shadows)

Heritage Lake beaver dam

It was a trek to find the location of the dam, but after a few bee stings and a swift jog, the Rangers were able to locate it. The dam was smaller than the one dismantled at Dufferin and could be removed within a day.



Photo 44 - Initial water level with beaver dam

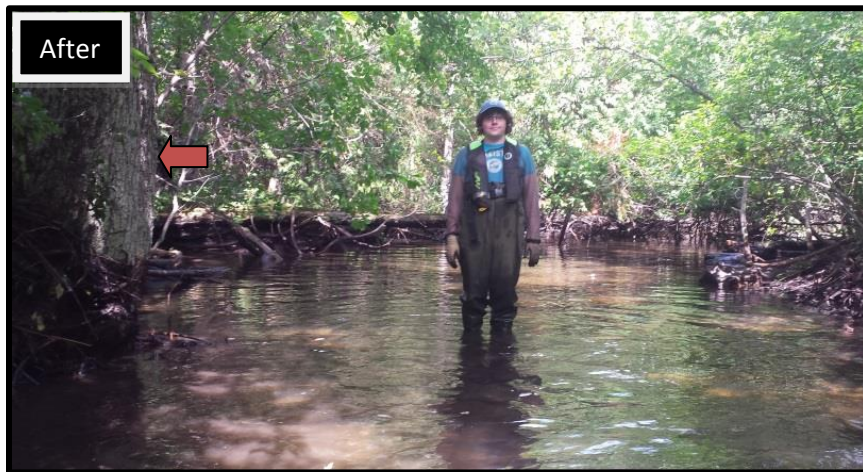


Photo 45 - Water levels following removal of beaver dam

Duscio Property



Photo 46 - Old bridge

A total of 1½ days were spent at this property removing woody debris. The first task was to remove an old bridge from the stream because it was obstructing stream flow and was a potential source of further debris. Most of the cedar logs used on the top of the bridge were easily removed and piled up on shore. The remaining structural frame was built out of some very large logs and it required the whole crew to carry them up onto the shore. Upstream of the bridge, a large tree had fallen into the creek. To prevent excess widening of the creek, the tree was cut apart using hand saws and redistributed along the shoreline to enhance habitat.

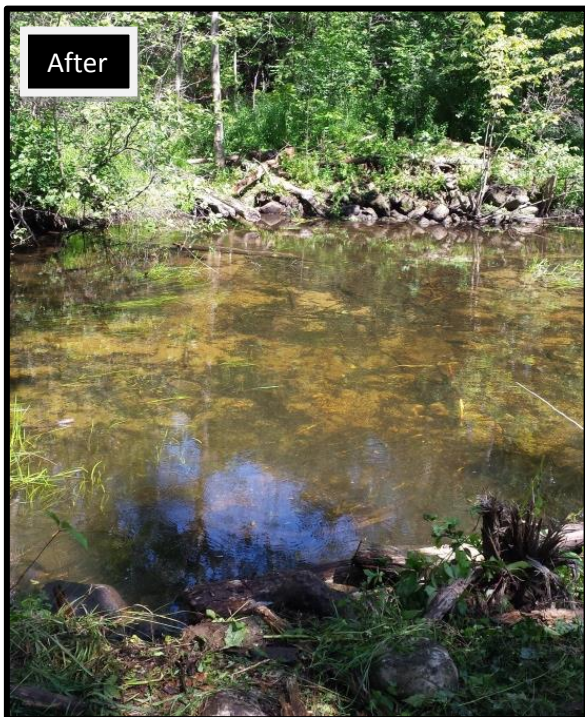


Photo 47 - Channel free of obstruction



Photo 48 - Rangers removing bridge

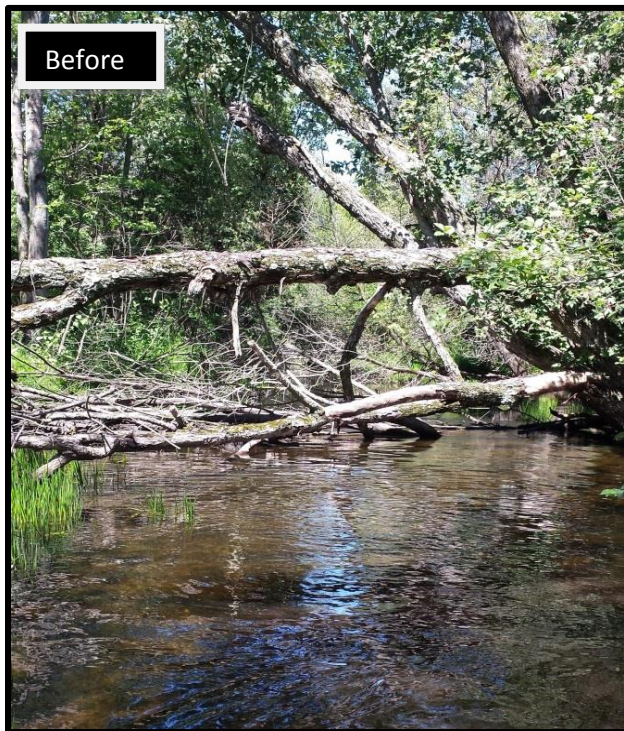


Photo 49 - Large in channel obstruction

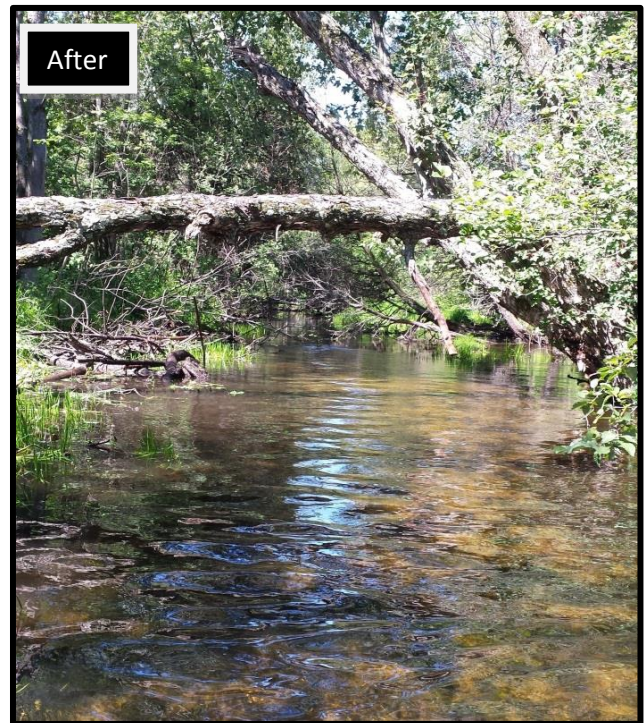


Photo 50 - Channel flowing freely

Ministry of Natural Resources and Forestry (MNRF) Work-day Collaboration

The MNRF Stewardship Rangers consisting of a crew leader and four summer students helped the Mill Creek Stewardship Rangers at the Lake's Farm Property. The extra muscle helped to remove some very large logs from the creek. The Mill Creek Rangers did a fantastic job of teaching the MNRF Rangers the proper techniques used in stream restoration, which they had become familiar with over the summer. The MNRF Rangers received hands-on training of debris removal and structure building. With both the crews working incredibly hard, they were able to clear a large logjam originally not anticipated as part of the summer's workplan. Overall, it was a very successful day.



Photo 51 - MNRF and Mill Creek Ranger Crews working together

4.0 Enrichment Opportunities

The Rangers participated in a variety of additional educational opportunities that allowed them to gain valuable experience and exposure in the environmental sector and to help out in the community. The purpose of these enrichment opportunities is to provide guidance and information for their long-term educational decisions.

Stream Side Lecture

Jack Imhof, National Biologist with Trout Unlimited Canada volunteered to speak with the Ranger crew about the unique history and characteristics of Mill Creek. The lecture took place at the Lake's Farm property. Jack started off the lecture with a brief history of the Puslinch Township's geology, emphasizing the unique mixture of sands and gravels found in the area. Rangers were then given an introduction into the basics of fluvial geomorphology. Topics included; natural meander patterns, pool and riffle sequences, stream type classification, water's physical



Photo 52 - Jack Imhof explaining the value of stream restoration

behaviour when flowing in a channel and the recognition of the stream's thalweg. These concepts gave the Rangers great insight and understanding into the physical processes occurring in Mill Creek. Jack also spoke about the unique aquatic diversity found in Mill Creek and how the restoration efforts performed by the Rangers will provide valuable habitat. Jack highlighted the fact that restoration projects can easily be recognized as successful by the presence/absence of certain aquatic species following restoration efforts. The lecture provided a much different perspective of Mill Creek which informed the Rangers in making decisions about future restoration plans.

Junior Camper Day

This event is funded by the City of Cambridge and organized by members of the GRCA and the Friends of Mill Creek. GRCA's Resource Interpreter Peter Pautler along with the Rangers hosted an educational workshop held at Shades Mills Conservation Area. Two community groups, Fiddlesticks and Alison Neighbourhood Associations attended the workshop in the morning and afternoon, respectively. Peter did an exceptional job of incorporating a wide variety of



Photo 53 - Ranger helping junior camper catch insects

fun activities with added educational benefits. Two stations were set up where the campers had the chance to interact and learn about terrestrial and aquatic ecosystems. The terrestrial station was located in a wild grassland area where campers and Rangers netted terrestrial insects. Species were then placed into containers and the Rangers assisted the campers identifying species using charts. The aquatic station took place in a shallow rocky section of Mill Creek. Rangers assisted the campers lifting rocks and netting aquatic insects. Most of the campers were pleasantly surprised to find so many different kinds of insects living so close to home! Feedback from the Rangers after the event was positive. They really enjoyed the opportunity to teach children from the local community about the diversity of their natural surroundings.



Photo 54 - Evan and Mitch helping catch and identify insects



Photo 55 - Dragon fly caught by campers

U of G Hagen Aqua Lab Tour

Mike Davies, assistant Aqua Lab coordinator from the University of Guelph treated the Rangers to an exciting tour of the University's research lab facility. A variety of salt water and fresh water species were observed, such as; rainbow trout, skate fish, starfish and zebra fish. All of the species were being raised for research purposes. Mike explained to the Rangers all of the variables that are controlled on site in order to maintain the artificial habitats. Mike gave a brief description of the individual species' characteristics and explained the environmental requirements of each. Mike finally spoke about the research sector as a whole, which allowed the Rangers to gain insight into potential career paths and the research opportunities that exist within a university.



Photo 56 - Rangers observing rainbow trout

Electrofishing Demonstration

Towards the end of the summer, the Rangers were able to investigate if fish were living under the structures that they worked so hard to build over the summer. The goal of the electrofishing demonstration was to sample the stream for the presence/absence of fish species. In the morning before heading out, Crystal Allan gave the Rangers a brief overview of electrofishing theory and safety procedures needed for effective and safe sampling. Once in the stream, Adam Riggi, Crystal Allan and Kaitlin Powers (GRCA Ecologist) showed the Rangers how to

effectively work as a team and communicate when sampling. The structures built by this year's crew yielded an impressive diversity of species. Several spectacular Brown Trout were captured along with several other species. A full list of the species caught during the sampling is included on the following page. Several of the Brown Trout netted during the sampling can be seen in photos 58 and 59. A photographer from the Waterloo Region Record observed the demonstration and a story was published in the paper the following day. The full story can be viewed in appendix 2.



Photo 57 - Entire ranger crew electrofishing at Lake's Farm Property



Photo 58 - Sam holding a Brown trout



Photo 59 - Drew measuring the length of a Brown Trout

List of species caught during the electrofishing at Lake's Farm Property:

Blacknose dace (8)

Rainbow Darter (5)

White Sucker (4)

Creek Chub (2)

Brown Trout (12) ranging in size from 60mm to 270mm

Nestlé Waters Plant Tour

The Rangers were invited to the Nestlé Waters facility located in Aberfoyle. Nestle Waters has been a large supporter of the Ranger program. Sam Gordon toured the Rangers through the facility and showed them the active production lines. Rangers were shown the precast of a water bottle and the machinery that ultimately produces the bottle. The Rangers were quite impressed with the operations and were glad to know that Nestle Waters has environmental standards set in place to protect the watershed.



Dufferin Tour

Rich sand and gravel deposits in the Mill Creek watershed attract many aggregate operations. Dufferin Aggregates have long been a supporter of the Mill Creek Stewardship Ranger program. Ron van Ooteghem, site manager at the operation, gave the Rangers a complete tour of the facility. The Rangers were shown every step in the operations from extraction, to transportation and the refining of material. The Rangers were quite impressed by the conveyor system used on site to transport material across the facility and reduced the number of dump trucks needed on site.



Photo 60 - Ron showing the rangers site operations

Ron also explained the complexities associated with aggregate extraction. The site is heavily regulated and monitored by the Ministry of the Environment and the Ministry of Natural Resources and Forestry. In order to keep their license, extraction activities must follow a set of strict regulations. Restoration plans for the site were extensive and it was informative to see a commitment ensuring that hydraulic gradients were leading back to the creek.

CBM Aquaculture

A lot of aggregate operations in the watershed have extracted material below the water table leaving behind large bodies of water. Stephen May, Lands Manager with CBM aggregates, provided the Rangers with a tour of an aquaculture pilot project raising rainbow trout in the former gravel pit (photo 61). The trout are held in isolated pens and water is pumped from the lake using high pressured air pumps. Any waste produced by the fish is captured and pumped into a holding tank on shore. The Rangers were impressed with the scale of the operation and thought it was a creative way to rehabilitate an old gravel pit.



Photo 61 - View of the pens holding the rainbow trout

5.0 Additional Activities

Donated Lunches

Several generous restaurants in the Mill Creek watershed donated complementary lunches to the Ranger crew. The group was able to take advantage of 4 lunches at the following locations: The Danish Place; A Change of Pace Restaurant; The Aberfoyle Mill; and The Village Family Restaurant. The Mill Creek Stewardship Rangers would like to thank all of these delicious restaurants for keeping them well fuelled. The crew appreciated your generous donations! It is nice to know that the community appreciates all of their hard work.

Friends of Mill Creek BBQ

Reality set in as the Rangers attended the annual appreciation BBQ held by the *Friends of Mill Creek*. The Rangers were treated to a delicious dinner provided by the Optimist Club and helped themselves to seconds and thirds! A detailed slideshow of this summer's work and a poster board was presented to the Rangers' families, the *Friends of Mill Creek*, partners and other interest groups.

The Rangers were very appreciative of all the hard work that the *Friends of Mill Creek* put in this year and would like to thank them for providing an awesome summer experience.

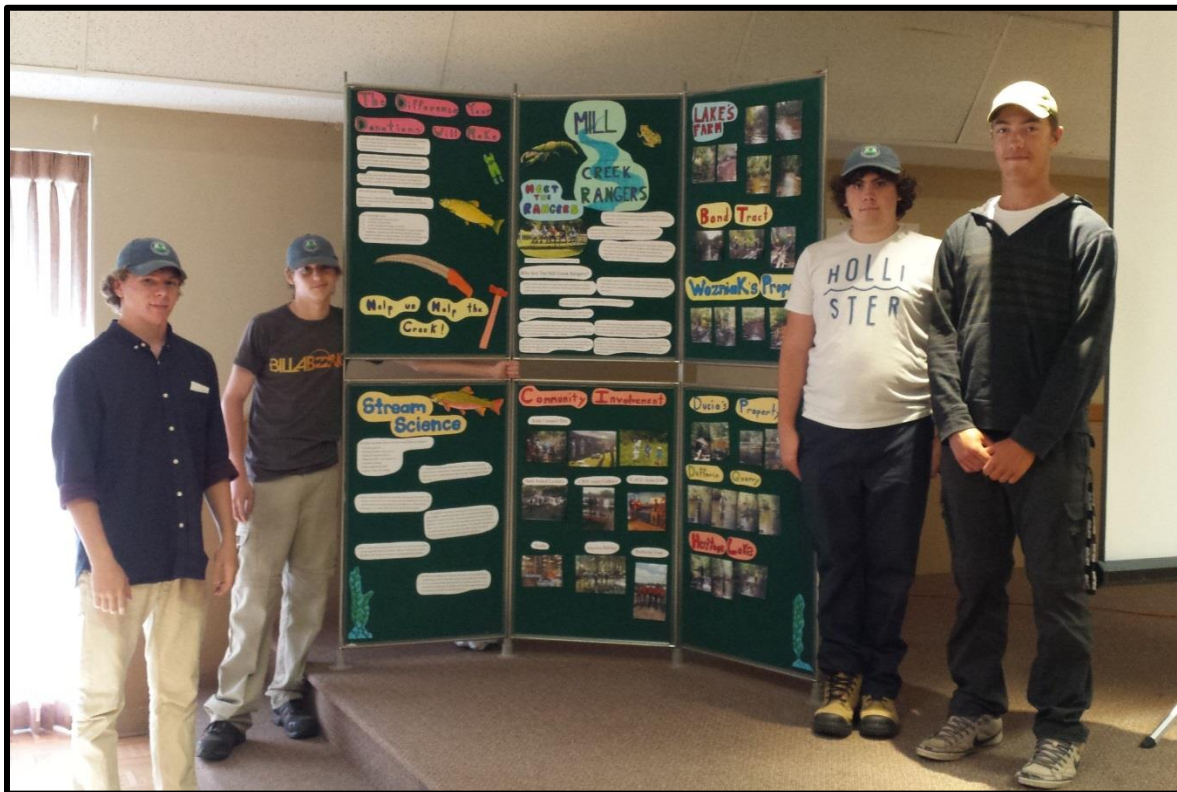


Photo 61 - Rangers presenting their information board

6.0 Rangers Comments

"I loved being a part of the Mill Creek Ranger Crew. I got to do hands on work restoring the local watershed and helped out in the community all while learning more about the natural watershed and the natural world. I will never forget this amazing experience." -Mitch Walker

"Being a Mill Creek Ranger has opened my eyes to the field of ecosystem restoration. The work was hands on and very interesting. Rehabilitating trout habitat and the other work we did as Rangers was a very rewarding experience." - Sam Neumann

"Working as a Mill Creek Ranger for the GRCA has been a new and exciting job experience. It has taught me many things about the way the creek works and about all the life that inhabits it. This job made me feel like I was accomplishing something and that is something most jobs cannot give." -Evan De Melo

"As a Mill Creek Ranger I was able to learn a lot about river systems and get hands on experience. It was a great way to spend the summer." - Drew Huggins

"It is very rewarding knowing all of our hard work is producing a healthier and more diverse environment. I love the fact that I am surrounded by people who share the same affinity for the natural environment. I really enjoyed learning from professionals working in the environmental sector because it has aided me in making future career path decisions. I would like to thank the Friends of Mill Creek for pioneering this amazing program and for working so hard to keep it going. Your work not only benefits the environment but also helps young people shape their futures. I am very proud of the work we accomplished this summer". - Adam Riggi

7.0 Recommendations

1. The electrofishing demonstration, if possible, should be performed on structures that Rangers completed during the summer. The rangers experienced a great deal of satisfaction seeing what species profited from their hard work.
2. The hand saws are getting dull, 3 new saws should be purchased. It is good practice to oil the saws with wd-40 at the end of every day.
3. Battery for the camera does not hold a charge, requires replacement. Lock button fell off the bottom of the camera therefore it is no longer waterproof.
4. A safety briefing should be performed before entering a new site. Make sure everyone on the crew knows the address of the work site.
5. Structures 1-3 were each anchored in place using an average number of anchors (8-10 per structure). Structures 4 and 5 were each anchored with less (4-5), asses the condition of structures 4 and 5, it may be possible to use less anchors that are strategically placed.
6. Further restoration work at Wozniak's Farm Property should proceed after a complete survey of the section treated by this year's crew is completed. Structures placed in-stream were anchored using a new method and should be checked for movement. Also, depending on the amount of sediment that has moved, woody debris might need to be re-placed closer to the thalweg to provide habitat for the brook trout.
7. Contact Nestlé Waters' Natural Resource Manager Andreanne Simard and see if the organization would still be interested in joining a work day on the creek.
Andreanne.Simard@waters.nestle.com
8. A full contact list of restaurants owners who have offered complementary lunches should be provided to the crew leader during work schedule planning period, lunches should be taken advantage of towards the end of a long work week to reward Rangers for their hard work.
9. Do not purchase waders from Canadian Tire. We purchased 3 pairs of Hodgman chest waders from Sail for \$80, if they last another season they may be the best bang for the buck. Look elsewhere for waders that are even more durable...?
10. Introduce a biological monitoring aspect to the Rangers work plan. It would be very useful to quantify the physical and biological differences Rangers are making each summer.
11. Try to arrange for enrichment opportunities with other private environmental consultants.
12. Contact Peter Pautler with the GRCA and speak with him about helping out the YWCA fish camp - Rangers in the past really enjoyed this event.
13. If possible work 8 hours days, it is a more efficient use of time. It rewards the Rangers with long weekends (only if they deserve it that is) and gives them extra time to rest their bodies after a hard work week.

Supplies needed for next year

2-3 cans of bug spray, earth anchors (0 remaining), 2 rolls of fencing wire (1.5 roll remaining), baseball hats, hard hats, waders, gloves, camera/ battery, patch adhesive (found at Canadian Tire in the camping section called vinyl repair kit).

Appendix 1: 2015 Ranger Crew Calendar

July

Mon	Tue	Wed	Thu	Fri
29 First day, health and safety orientation, tour of watershed	30 First aid training and CPR	1 HOLIDAY!	2 Bond Tract and Lakes site visit	3 Jack Imhof's stream lecture, afternoon - debris clearing
6 Lakes debris removal	7 Bond Tract, T-bars	8 Lakes, debris removal and structure building	9 Lakes structure building	10 Lakes wiring
13 Dufferin beaver dam removal	14 Rain day - patching waders, supplies run and slideshow	15 Shade's Mill camper day orientation	16 Kids camper day	17 OFF
20 Lakes wiring	21 Morning - Nestle waters tour, afternoon- Dufferin beaver dam	22 Lakes structure building	23 Lakes wiring	24 MNRF crew collaboration @ Lakes debris removal
27 Lakes structure building	28 Lakes wiring	29 Lakes wiring	30 Beaver dam removal @heritage lakes	31 OFF

August

Mon	Tue	Wed	Thu	Fri
3 Holiday	4 Wozniak's	5 Wozniak's	6 Bond tract, T-bar removal	7 Bond tract, T-bar, "Sunset Villa" (late lunch)
10 U of G Aqualab, CBM Aquaculture	11 Dufferin site tour, Lakes w Kaitlin	12 Presentation in the morning, Tony D. in the afternoon	13 Tony D. full day	14 OFF
17 Electrofishing lakes property	18 Lakes for photos, presentation afternoon	19 Presentation all day	20 Presentation all day, FOMC evening BBQ	21 Last day, "A Change of Pace" lunch and tool count

Appendix 2: Media Coverage

Electrofishing in Mill Creek



Jolt-and-release

David Bebee, Record Staff

Mill Creek stewardship rangers crew leader Adam Riggi, middle using a backpack electrofisher is assisted by fellow rangers Sam Neumann, left and Evan Demelo with nets and behind, Drew Huggins, left and Mitch Walker as they collect fish. The rangers were conducting a fisheries assessment of Mill Creek to see how recent creek restorations improvements are working.



Measuring a brown trout

David Bebee, Record Staff

Mill Creek stewardship ranger Sam Neumann, measures a brown trout. The rangers were conducting a fisheries assessment of Mill Creek to see how recent restorations improvements are working

Never mind messing with wiggly worms or kaleidoscopic lures.

Just drop a touch of low voltage into the drink. That really makes the fish charge to the surface. Such is the happy — and humane — hook of jolt-and-release electrofishing.

It puts the current back into the current.

Just zap the water and wait for the fish to float up.

"That's exactly it," said Crystal Allan, the Grand River Conservation Authority's supervisor of natural heritage, as she stood in the shallow waters of Mill Creek between Cambridge and Guelph on Monday

"Push the 'on' button. Zaps the water. Sends out a current."

But these fish do not get fried. Nor are they destined to be pan fried.

This is no guilty Green Mile march for the guild of the gilled.

It's just a friendly fish-head count and gentle stream checkup performed by Allan and a teenage team of Mill Creek Stewardship Rangers on a hot August Monday.

They look more like Slimer-hunting Ghostbusters than trout-stalking stream-walkers.

Everybody wears chest-high rubber waders and shoulder-high rubber gloves to protect them from a shocking misadventure. They each have a life-jacket and visor. Polarized fish-finding shades complete the ensemble.

One of the certified electrofishers wears the battery-carrying back pack while prodding the water with what looks like Harry Potter's spell-casting phoenix feather.

"They have an anode which looks like a wand," Allan said.

The fish are enchanted and drawn upward as an electric circuit a metre or two wide is created in the water.

Two netters scoop them out. Two bucket-toters bring them back to their senses.

They all get identified, measured, then plopped happily back into the clear, free waters.

The whole process takes only a few stress-free fishy moments.

About 50 fish came up on Monday. brown trout and black nose dace, carp and creek chub, rainbow darters and white suckers.

Allan was pleased. The Rangers have worked hard to restore this creek to fish-friendly status. One brown trout measured 270 mm.

"He was beautiful," Allan said.

And back into cold Mill Creek, he was sent.

For these fish, on this Monday, there was no place like ohm.

jhicks@therecord.com

Appendix 3: Equipment Inventory

Work gloves- Leather

Large/Medium (all used)

Safety glasses - 10

Safety vests – 7

Safety cones – 4

Muskol – 4

Sunscreen – 6

Hand Sanitizer – 4

Small Dry Bag – 2

First Aid Kit – 2

Bug jackets – 5

Polarized glasses – 4

Ear Plugs – lots

Red Insulated 7 L Water Cooler – 1

Green Water Cooler – 1 (missing lid)

PFD's – 5

Waders patching materials

Wader Goop– ½

tube

Multi-bit

Wader Belts - 7

Wader Size Quantity

5	1
6	1
7	1
8	6
9	2
10	2
11	2
12	3
13	2

Tools and Equipment

Buckets - 11

Crow bar - 1

Wheel barrows – 2

Bolt cutters – 2 (one large and small)

Loppers – 4

Hammers – 3

Ball Peen Hammer – 2

File – 1

Hatchet – 3

Pick Axe – 2

Screwdriver - 1

T-bar pounders – 4 (1 broken)

Pitch fork -2

Sledge hammers – 6

Rakes – 2

Shovels

Long – 7

Small – 3

Tiny – 2

Spades – 11

Hand Rake tool – 2

Come-along Winch - 1

Peavey Pole – 2

Hand saws

Pull saws – 9 (2 new and 7 used, one is missing screw in handle)

Long, Curved – 2 (one handle to be replaced)

Long, Straight – 3

Bow saws – 3 (one is small)

Spare saw blades

Black malleable wire – 1 roll + ~10 meters

Wire Cutter – 1

Pruners - 2

Fencing pliers – 4

Earth Anchor insertion tool – 4 (2 taller rods are new and should be used)

Earth Anchor driver – 1

Earth Anchor crimping tool - 1

Supplies

T-bars - lots

Earth Anchor 8' tethers – 12

Crimps for 1/8" cable – lots

Fencing staples – ¼ large bucket

Paper Towel – 2 rolls

Ziploc Bags – lots

WD-40 – full can

Fluorescent Orange Spray Paint – ½ can

Friends of Mill Creek magnetic truck sign - 1