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Mill Creek is a low-gradient, coldwater stream located in Southern Ontario. The headwaters are found southeast of Guelph in Puslinch Township near the small community of Aberfoyle. The stream flows south-west entering the Grand River in downtown Cambridge and has a total watershed area of 104 km\(^2\). Two important features of the watershed are that nearly 40% of the watershed is covered by wetlands and forests due to the low gradient nature of the landscape, and the creek receives large amounts of groundwater influx, helping to moderate water temperatures. Mill Creek has not been isolated from the impacts of urbanization, agriculture, resource extraction, or other land-use changes prevalent in the last century. The Mill Creek watershed has been adversely impacted specifically by highway construction, aggregate removal and channel alterations. Some reaches of the creek have been more severely impacted then others, these negative effects include increased temperatures, high sedimentation levels, and widened stream channels. Despite these impacts, Mill Creek remains a cold water stream with reaches showing strong environmental health due to community and industry partnerships that are committed to further improvements in the watershed.

Figure 1 Rehabilitated Reach of Mill Creek
Based on recommendations from the 1997 Subwatershed Study, the Friends of Mill Creek coalition was created to maintain and restore the environmental health and important ecological functions to the Mill Creek watershed. In 2003, the Mill Creek Stewardship Ranger program was initiated, in order for in-stream rehabilitation efforts to be completed beyond the scope of volunteer efforts. Results over the past years have exceeded expectations, providing the Friends of Mill Creek with strong grounds for continuing the unique Mill Creek Stewardship Ranger program annually. As seen in Figure 2, the rangers efforts are working to enhance the natural features and functions of the Mill Creek. This program merges environmental education with the stream restoration projects, in order to facilitate an environmental awareness and explain ‘how’ actions are improving the watershed.

The Mill Creek Stewardship Ranger program funds four crew members and a crew leader annually, to implement and conduct stream rehabilitation efforts on Mill Creek throughout the summer. The program is funded through contributions made by watershed stakeholders, community businesses and awarded community funds. Rehabilitation efforts have been focused on maintaining the existing trout populations, and improving habitat conditions throughout the creek to increase viability. Trout species are indicators of strong ecosystem health, as they require high water quality, cold water temperatures and suitable habitat for various life stages. While targeting rehabilitation efforts to trout species, the overall restoration efforts positively impact the ecosystem as a whole. Projects undertaken by the ranger crew include stream bank stabilization, riparian re-vegetation, debris removal, fish habitat creation and pond removal. These actions result in diverse improvements including increased spawning habitat (gravel substrate), decreases in water temperatures, and narrowing of the stream channels, among others.

The remainder of this report outlines and summarizes the activities of the 2011 Mill Creek Stewardship Ranger Crew in the ongoing efforts to rehabilitate Mill Creek. The ranger crew worked on restoration projects and environmental enrichment activities from July 4th to August 26th, 2011.
RANGER CREW MEMBERS OF 2011

Figure 2 Mill Creek Creek 2011 From left to right: Adam Riggi, Daina Anderson, Erika Hentsch, Rob Monico, Ian Rodgers

**Crew Leader**
- Daina Anderson – Kitchener

**Crew Members**
- Adam Riggi – Cambridge
- Erika Hentsch - Cambridge
- Ian Rodgers - Aberfoyle
- Robert Monico – Guelph

**Technical Advice**
- Robert Messier - GRCA

**Supervisor**
- Crystal Allan - GRCA
TRAINING SUMMARY

In accordance with the Grand River Conservation Authority’s health and safety policies, the ranger crew participates in a thorough training program to prepare them for the nature of the work completed over the summer and the students’ responsibilities as staff members.

GRCA HEALTH AND SAFETY ORIENTATION

A half day training course was given that outlined the Grand River Conservation Authority as an organization. Workers’ rights and responsibilities as outlined in the Occupation Health and Safety Act were encompassed. Policies surrounding a range of health and safety hazards were discussed including heat stress, working around water and heavy lifting, amongst many others. The Workplace Hazardous Material Information System (WHMIS) was also covered in this training.

FIRST AID, CPR AND AED TRAINING

Each ranger gained Emergency First Aid certification, achieving CPR level “A” and AED training from St. John’s Ambulance in Guelph through a full day course. This was completed in conjunction with the Waterloo-Wellington Ontario Stewardship Rangers.

ELECTROFISHING TRAINING

A half day electrofishing seminar was given to the Rangers by Lori Richardson, Monitoring Coordinator at the GRCA. The basic electrical principals and theories of electrofishing were reviewed, along with the equipment and safety hazards. Following the half day training, the rangers gained practical experience through a full day of electrofishing on the section of Mill Creek accessed through Ed Lake’s property. In this section of Mill Creek, the crew electrofished two reaches, one downstream where the stream had been rehabilitated in past years and an upstream portion untouched by the rangers in their rehabilitation efforts. This opportunity provided the rangers with an awareness of the fish species present in Mill Creek, in addition, to a better understanding of the use of electrofishing as a biological sampling method. The two reaches of the creek were much different in their ease of being electrofished, as the untouched section had a significant amount of downed woody debris within the stream making netting of shocked fish less successful. Overall, it was an excellent educational opportunity that was well received by all rangers.

Figure 3 Electrofishing on Mill Creek
ENRICHMENT SUMMARY

In addition to the physically demanding rehabilitation work done on Mill Creek, the crew is privileged to be exposed to a variety of educational days that enrich their summer experience and expose them to a wide range of environmental projects and industry initiatives in the region.

STREAM DYNAMICS LECTURE

Jack Imhof, the National Biologist for Trout Unlimited Canada, came out to Mill Creek to give an in-stream lecture to the Mill Creek Rangers and the Waterloo-Wellington Ontario Stewardship Rangers. Jack Imhof gave an impressive presentation, covering the basics of stream dynamics, including discussion of the physical processes that define the stream channel, which inherently impact the biological functions of waterways. Jack outlined that stream rehabilitation efforts are needed in Southern Ontario due to the past changes in land-use, with specific reference to Mill Creek and its low-gradient nature. Jack Imhof discussed the principal concepts of fluvial geomorphology and explained how geology defines the stream channel form. The conclusion of the lecture explained that an understanding of fluvial processes is needed along with knowledge of the historical characteristics of the stream when making key decisions in stream restoration.

Contact: Jack Imhof, National Biologist, Trout Unlimited Canada, jimhof@tucanada.org

GREEN LEGACY WORK DAY

The Mill Creek Ranger Crew spent a day at the Green Legacy Tree Nursery, where they gained insight into the reforestation efforts undertaken by Wellington County. Brenda Walsh, the Outreach Coordinator for Green Legacy, gave a presentation to the rangers about the history of the Green Legacy program and the impressive undertaking by Wellington County to build a successful community-based program. The work day included transplanting trees, relocating seedlings and stocking the cold cellar.

Contact: Brenda Walsh, Green Legacy Outreach Coordinator, County of Wellington, brendaw@wellington.ca, C:519-546-4788
MARDEN CREEK REHABILITATION

In conjunction with the Waterloo-Wellington Ontario Stewardship Ranger Crew from the Ministry of Natural Resources Guelph District office, two days were spent working on stream rehabilitation projects on Marden Creek, located north of Guelph. This work exposed the rangers to an increased variety of stream restoration projects. The rangers were able to gain an appreciation for the importance of understanding stream dynamics and historical land use when adapting rehabilitation projects for a specific creek, as each system has its own unique characteristics.

Contact: OSR Team Lead or Larry Halyk, Wellington Stewardship Co-ordinator, larry.halyk@ontario.ca, 519-826-4936, C: 519-830-0822

RIPARIAN RE-VEGETATION

A day was spent working on Marden Creek to enhance the natural establishment of vegetation along the stream banks. The portion of the creek that the crew worked on was located near the Ignatius Jesuit Centre where Marden Creek crosses Highway 6, north of Guelph. In this location a historic dam was decommissioned the previous year, which left behind an expanse of mud flats which were slowly re-vegetating. The rangers planted cuttings of various willow and dogwood species along the stream banks within the mud flats, focusing on outside meandering bends of the creek to improve bank stabilization.

STREAMBED MODIFICATION

Another day was spent in the same section of Marden Creek to improve the stream flow under a foot bridge and on either side of Highway 6. Rocks of many sizes were creating a bottleneck where a foot bridge crossed Marden Creek. The ranger crew worked to remove rocks that were constricting the flow in and around the foot bridge to improve flow, especially during flood conditions. Immediately, up and downstream of the Highway 6 bridge there are small and medium sized rocks that were creating a rigid stream channel, which created issues during high water levels. The crew worked to decrease the slope of the stream banks by removing some of the rocks in order to increase the stream channel flow capacity.
GRCA ENVIRONMENTAL PLANNING MENTORSHIP DAY

A new opportunity was initiated this summer to expose the rangers to some of the core responsibilities of the GRCA. Two Resource Planners, Liz Yerex and Lisa Beth Bulford, accompanied the rangers to Mill Creek for the morning to allow Liz and Lisa Beth the opportunity to get some hands-on experience assisting in stream restoration. In this environment the rangers were able to interact with the planners, and ask questions about their experiences' and career ambitions in a more casual environment. The afternoon was spent in Soper Park, where the planners explained the permit review and approval process that is required for many development and environmental alteration projects in the GRCA’s regulated jurisdiction. Mrs. Yerex and Ms. Bulford outlined future in-stream and stream bank work to be done in Soper Park and the role of the resource planners in reviewing permit applications to get the necessary approvals. Soper Park provided an ideal setting for the discussion, because the rangers were able to see the practical application of the topics Mrs. Yerex and Ms. Bulford were discussing. This mentorship day provided a unique learning opportunity for the rangers, exposing them to some of the operations of the GRCA.

ENVIRONMENTAL MONITORING FOR AGGREGATE PITS

Lisa Wren gave a half-day, detailed presentation of the monitoring work that is required for an aggregate company operating in close proximity to Mill Creek. Mrs. Wren is an environmental consultant conducting the environmental monitoring work for Dufferin Aggregates. Mrs. Wren explained how the aggregate operations can impact the hydrogeology in the vicinity of the creek and consequently the biological components of the creek. Within Mrs. Wren’s presentation, she overviewed past and present trends in trout populations and redd counts as found in the sections of Mill Creek adjacent to the Dufferin Aggregate operations. In addition, Mrs. Wren shared a short presentation on Aquatic Species at Risk in Canada and the legislation protecting these species. Lisa Wren was a very engaging speaker, with genuine enthusiasm for her work. She also has significant insight having been involved in the aquatic health monitoring on Mill Creek since Dufferin Aggregates commenced their operations.

In the latter half of the day, the crew went out to the Dufferin Aggregates site to see the sections of the creek that are monitored for impacts. We also assisted in some trail clearing to create a path alongside the creek to aid the electrofishing crew in their sampling.

Contact: Lisa Wren, LRG Consulting, lwren@everus.ca, 519-986-3233, C: 519-835-3798

NESTLE WATERS FACILITY TOUR

A tour of the Nestle Waters water bottling facility was another educational opportunity experienced by the ranger crew. This tour covered the different water products bottled at the Aberfoyle site, from uptake at the source to distribution across Canada. The tour encompassed details surrounding water quality assurance and precautions undertaken, as well as the recent efforts to reduce water and energy use. In addition to the facility tour, Don Demarco, Natural Resource Manager, went into further detail about the groundwater monitoring that is carried out by Nestle. Through this experience, the rangers were able to gain an appreciation for the effort that goes into the creation of a bottled water product and Nestle Water’s efforts to support the protection of their local environment.

Contact: Don DeMarco, Nestle Waters, don.demarco@waters.nestle.com
The rangers were given a thorough tour of the Mill Creek Pit of Dufferin Aggregates by Ron Van Ooteghem. The tour was proceeded by an explanation of the regulatory requirements in place that outline the necessary environmental studies that are ongoing to monitor aquatic health, groundwater levels, surface water levels, noise and dust pollution at the aggregate mine. Mr. Van Ooteghem overviewed the site and long-term plans for the management and operations of the site. The site tour exposed the rangers to the full cycle of aggregate extraction from processing to distribution, along with an explanation of the products created from extracted aggregates. Mr. Van Ooteghem explained the ongoing restoration efforts to create shorebird habitat and eventually fish habitat in the ponds created from the gravel extraction. From this tour, the rangers gained an understanding of some of the environmental monitoring obligations in place for resource extraction industries and the efforts taken to protect sensitive resources.

Contact: Ron Van Ooteghem, Dufferin Aggregates, 905-627-7711, ron.vanooteghem@holcim.com
WORK PROJECTS OF 2011

INSTREAM WORK ON SECTION OF MILL CREEK ACCESSED BY ED LAKE’S PROPERTY

A significant portion of the ranger’s summer was spent removing in-stream flow obstructions and creating deflector structures on the section of Mill Creek accessed through Ed Lake’s property. This section of the creek is wide, shallow and has a fairly low gradient with high sediment accumulation due to large amounts of woody debris that have built up and slowed the stream. Working according to the guide for improving aggraded rivers, *Phased Approach to the Restoration of Lower Gradient, Sediment Choked Streams* by Jack Imhof, the crew focused on implementing the outlined first and second phases of restoration in a section of the creek upstream of past rehabilitation work. Initial obstruction removal was carried out to allow sediment to be flushed out. Most flow obstructions consisted of downed logs which were causing impediments to the flow, where suspended sediment was able to settle and accumulate. In the course of a few days significant obstructions were removed and visible gravel substrate was exposed, even with the implementation of only initial debris removal. Additional obstructions were removed including overhanging vegetation that also impeded flow and collected additional debris. Care was taken to detect the main flow channel of the creek in order to enhance the natural meandering pattern of Mill Creek through the repositioning of woody material.

In this section of creek where the crew was working, deflectors and log structures were installed according to Phase 2 of Imhof’s approach to refine the channel form and build banks. Focus was given to enhancing the meandering pattern through which the creek dissipates energy and transports sediment. As sediment was beginning to be scoured from the large accumulations, the thalweg of the creek became detectable allowing for the placement of logs and debris to enhance the natural pattern and build narrower stream banks. After the initial obstructions were removed, no woody debris or material was outright removed from the creek, instead it was redistributed in a manner that would help narrow the stream channel and provide habitat cover, without causing cross channel flow obstructions.

![Figure 8 Placing Fine Woody Material to Capture Sediment in Deflectors](image1)

![Figure 8 Anchoring Deflector with ‘Earth Anchor’ Equipment](image2)
When building structures to narrow the creek and initiate the building of banks, time was taken to lay a foundation of fine woody material, including small branches and cedar boughs as seen in Figure 9. Next, large logs and branches were piled in streamlined bundles in order to minimize the space between logs. Lastly, small gaps were filled with small branches and cedar boughs in order to slow down the creek flow around and within these structures in order for sediment to accumulate and new banks to be established. Effort was made to ensure structures were built tight into original banks to prevent flood waters from eroding behind artificial banks. After tight structures were created with enough woody material, time was taken to securely wire and anchor the structures into the streambed as illustrated in Figure 9. The ‘Earth Anchor’ system, distributed by Simcoe Environmental Technology, was used to anchor deflectors and other structures, as used successfully in the past.

The rangers made great progress on this section of the creek, anchoring over 10 structures (some very large), in a section of the creek approximately 300 m in length.

BEFORE AND AFTER PICTURES
INSTREAM WORK ON MILL CREEK ON CAPITAL PAVING PROPERTY

Significant improvements have been made through past work on the section of Mill Creek flowing through the property owned by Capital Paving. Efforts over the last few years have focused on narrowing the stream channel, including filling in an online pond in 2009. This year, the rangers were working downstream of the filled in pond, removing obstructions and building deflectors to continue to narrow the stream channel throughout the property.

The gradient of the stream is quiet low in some areas on the property. Significant aggradation of sediment has built up in some sections, while in other areas there is gravel and large cobble substrate. The work was carried out in similar fashion to the instream work done at Ed Lake’s. Woody debris that was causing flow obstructions and sediment accumulation were redistributed. Effort was focused on creating deflectors to narrow the stream flow and facilitate sediment deposition in slow moving areas. A large log dam was removed, which was dispersing flow and widening the streambed. Approximately 10 structures were anchored in a section nearly 200 m in length. There were 4-5 large logs that had fallen across the stream that may need to be removed with assistance from the forestry department next year due to their size.

BEFORE AND AFTER PICTURES

Figure 14 Mill Creek at Capital Paving Before

Figure 14 Mill Creek at Capital Paving After
SOPER PARK

Soper Park provides a unique experience for the rangers to implement a variety of stream rehabilitation projects within an urban environment where there are unique challenges. Mill Creek flows through Soper Park and has been a historical feature for the local residents who value its aesthetic and recreational values. Working on projects in Soper Park allowed the students to see that a stream in an urban environment plays a role in storm water management, as a catchment for peak flows and run off from impervious surfaces. Within Soper Park, Mill Creek has undergone marked changes and improvements over the years.

BANK STABILIZATION

Many years ago in Soper Park, a new channel was engineered for Mill Creek following Natural Channel Design principles. Armoured stone was used on the outside bends of the meandering creek to help dissipate energy from increased urban storm water flows. Over time the water has been eroding the banks behind some of these stones creating large gaps and holes that are safety hazards as displayed in Figure 17. In addition, children have been playing in the creek creating rock dams that have further eroded and widened the creek downstream of a reinforced bend by the Tennis club.

In conjunction with the City of Cambridge and Dufferin Aggregates, 16 tonnes of small and medium stones were brought in to fill these gaps and eroded banks. The stones were moved by wheel barrel and with the City’s park staff through the use of their Gator to create a small scale solution that didn’t require the use of large equipment (Figure 16). The expectation is that the stones will offer enough stabilization support for the bank, compared to filling the gaps with dirt alone. After the stones were placed in the gaps and along the eroded bank, the City of Cambridge staff placed soil on the surface of the stones and spread grass seed to vegetate the expanded stream banks and prevent the new rocks from becoming additional materials for the children to use in their rock dam.

Figure 15 Transport of Rock Material to Fill in Eroded Banks

Figure 16 Gaps between Armour Stone
TREE PLANTING

Over the past few years a lot of effort has gone into increasing the riparian vegetation in Soper Park, with emphasis on the stream banks upstream of the Galt Arena. This year, native vegetation was planted upstream of the small bridge before the arena, including approximately 10 large trees and 30 shrubs. Species included Red Maple, Bur Oak, Red Osier Dogwood, Raspberry, Ninebark, Elderberry and a few others. The aim is for this area to offer increased buffer width, biodiversity, habitat, and shade around the creek. Particular attention was given to a small area of the bank that was eroding and had a steep incline. The area was regraded and also planted to help promote the stabilization of the bank. In addition, one tree and approximately 10 shrubs and 30 wildflowers were planted behind the armour stone along the stream bank immediately downstream of the pedestrian bridge by the tennis club. After all the vegetation was planted, the crew made large mulch rings around the trees and shrubs and spread a thin layer of mulch over the area to help remind city staff not to mow this increased buffer area. The planting was done with the help of Paul Wilms, an Environmental Planner at the City of Cambridge and in partnership with Cambridge Stewardship which obtained the planting material, mulch and equipment for the planting.

GARBAGE REMOVAL

Along with the bank stabilization and tree planting projects in Soper Park, some instream garbage removal was carried out. This garbage pickup was not as extensive as in previous years but a small amount of garbage was removed from Mill Creek within Soper Park.
BEFORE AND AFTER PICTURES

Figure 204 Soper Park Before (Eroded Banks)

Figure 241 Soper Park After (Bank Stabilization)

Figure 242 Soper Park Before Dam Removal and Bank Reinforcement

Figure 243 Soper Park After Dam Removal and Bank Stabilization

Figure 244 Soper Park Before Tree and Shrub Planting

Figure 24 Soper Park After Tree and Shrub Planting
ADDITIONAL ACTIVITIES

FRIENDS OF MILL CREEK BOARD MEETING

Early in July, the ranger crew attended the first portion of a Friends of Mill Creek Board meeting. I believe this was a great experience for the rangers to be introduced to the individuals that form the committee that drives the community initiatives in the watershed. The Mill Creek Ranger program is a very unique, community based program and it is important for the rangers to understand the commitment of the different partners and residents to improving the health of the Mill Creek Watershed.

FRIENDS OF MILL CREEK BARBEQUE

Near the end of the summer, a barbeque catered by the Puslinch Optimist Club, is organized to recognize the community funders and the ranger group for the progress achieved that summer. In addition to the poster board that is created annually (displayed in Figure 26), this year the rangers gave a PowerPoint presentation, introducing the attendees to the crew and the variety of work completed over the summer. Each crew member spoke for around 3 minutes. This presentation was very effective in explaining about the projects completed and results achieved over the summer. Furthermore, it was amazing for all to see the genuine enthusiasm and interest the rangers expressed for the work they were completing that summer. There was a lot of positive feedback from the Friends of Mill Creek Board and the barbeque attendees on the effectiveness of the presentation given by the rangers. It is highly recommended that a PowerPoint presentation be given in subsequent years.

DONATED LUNCHES

This year, in-kind donations of lunches from A&W, A Change of Pace, Sunset Villa and the Aberfoyle Mill were graciously received by the rangers. These lunches were much anticipated after a week of hard, physical labour.

SUMMARY OF INCIDENT AND ACCIDENT REPORTS

There was one small accident this summer when a student pinched their finger between two rocks when removing a small rock dam at Soper Park. The result was a 4 cm contusion with no surface bleeding. First aid treatment applied was an ice pack. The student was back to work within 15 minutes. It is important for the students to be aware of their immediate surroundings and the overall hazards in their working environment. An incident report was completed with GRCA Supervisor.
MEDIA COVERAGE

On August 10th, 2011 a variety of media outlets came to Soper Park to witness the Mill Creek Stewardship Rangers in action. The rangers were working with Cambridge Stewardship to plant trees along Mill Creek. CTV featured the Rangers in the ‘Local Heroes’ segment of the news on August 10, 2011 which overviewed both the Cambridge Stewardship program and the Friends of Mill Creek organization. The clip has been posted on Youtube, ‘Cambridge Stewardship in Soper Park. Tree Planting’. The permanent link: http://www.youtube.com/watch?v=RJe32MP0qxA.

A nearly ½ page colour photo was in the Kitchener/Waterloo paper, The Record, on August 11, 2011, showing the rangers at work in Mill Creek. The Cambridge Times also had a picture in their paper on August 11, 2011, showing the students planting trees. Cambridge Now! had a long story on the partnership of the Mill Creek Rangers and Cambridge Stewardship posted online, http://www.cambridgenow.ca/npps/story.cfm?nppage=2249. A copy of the articles are found in Appendix 1.

RECOMMENDATIONS

The Mill Creek Stewardship Rangers is an excellent, educational program. From my personal experience and feedback from the crew, the following recommendations have been suggested.

1) I think it would be beneficial to teach the techniques of Earth Anchoring as early as possible in the summer to allow for the instream debris removal, structure building and anchoring to be done in a step by step, staggered process. This year the crew got ahead of themselves in debris clearing before being able to earth anchor, which then caused the crew to spend back to back days of wiring and anchoring structures. Evenly spacing the steps would make the process more enjoyable.

2) It would be helpful if supplies for the summer, such as wire and Earth Anchors were ordered in bulk before the students start so that the crew does not have to spend time organizing the supplies needed.

3) Next year, it would be beneficial to get the forestry crew out to the site at Capital Paving to remove 4-5 large trees that have fallen across the creek.

4) Past ranger crews have had a variety of electrofishing opportunities. In particular, Lisa Wren organizes the aquatic health monitoring on Mill Creek for Dufferin Aggregates and at the end of August, when a mark and recapture electrofishing survey is completed. This long-term study has provided some consistent data on the change in brown trout populations and the health of the creek. Ranger crews in the past have helped for three of the days as netters, and I believe future participation would be beneficial to the rangers as this would be an educational experience where the rangers could learn more about the survey methods and the overall aquatic system. Future opportunities will need to take into consideration GRCA’s Electrofishing policies.

5) This year the new addition of the environmental planning mentorship day was enjoyed by the rangers, who were able to learn more about the GRCA’s role in protecting and regulating development in floodplains, wetlands and near water bodies. The half day of work provided a more informal atmosphere for the rangers to interact with the planning staff and ask a variety of questions. The half day on-site presentation was also an interactive way for the rangers to gain an appreciation and further
understanding of the work of the resource planners. I believe this type of mentorship day should be continued in future years to allow the rangers to see more of GRCA’s roles in environmental regulation.
Trees For Trout: Stewardship Rangers & City Of Cambridge Team Up

*Setting The Stage For Ideal Habitat For Local Fishing*

By Cambridge Now! Local News

Above Photo: Mill Creek Stewardship Rangers

**Trees & Teamwork For Trout**

**In-stream Clean Up Initiated**

Cambridge, Ontario - Projects to improve the trout-bearing Mill Creek are in the works in Cambridge.
The Mill Creek Stewardship Rangers planted indigenous species of trees, shrubs, and wildflowers on Wednesday August 10th, as well as conducted an in-stream clean up, removing in-stream rock dams, fixing erosion sites, and shoring up the banks of Mill Creek at two locations in Soper Park.

“The City congratulates the Friends of Mill Creek and Mill Creek Stewardship Rangers for their contribution to creating a healthier stream in Cambridge through planting along its banks and performing in-stream clean ups of debris and litter,” says Paul Willms, Environmental Planner for the City of Cambridge.

Members of the Mill Creek Stewardship Rangers will plant 10 large trees, 40 shrubs, and 30 wildflowers along Mill Creek as part of the 2011 projects that stretch into Puslinch Township and the headwaters.

The Mill Creek planting on August 10th caps off a successful year for the Cambridge Stewardship project, as well as a 5th anniversary for this community-based tree planting effort and a 12th anniversary for the Friends of Mill Creek. Cambridge Stewardship was initiated by Cambridge City Green in partnership with the City five years ago and 1,000 volunteers have planted over 5,000 indigenous trees, shrubs, and wildflowers at 14 sites across the city.

Funding partners for the 2011 Mill Creek project include: The City of Cambridge; Cambridge & North Dumfries Community Foundation and the Ages Foundation; TD Friends of the Environment Foundation; Waterloo Stewardship Network; and Cambridge City Green. Over the past five years, these and Cambridge Stewardship’s other generous funding partners contributed $5 for every $1 of City tax dollars in their support for the establishment of indigenous plants and a healthier environment in Cambridge.

In addition to the contributions of the funding partners, the volunteer planters put in “sweat equity.” “Cambridge City Green volunteers, funding partners, and groups like the Mill Creek Rangers work hard on these projects which enhance our natural heritage,” says Willms. “They come back over the years and are pleasantly surprised by the growth and change at these planting sites.”

The mission of City Green’s Cambridge Stewardship project is to establish indigenous trees, shrubs, and wildflowers across the city. Enhancing areas with native vegetation provides many benefits including groundwater recharge, shade through increased canopy (and therefore cooler temperatures for coldwater streams like Mill Creek), enhanced habitat, and increased biodiversity in an urbanizing landscape that has seen many invasive plant species recently established. But it’s not just about the plants, it’s about people and community development – by involving local schools, businesses, and community organizations like the Friends of Mill Creek and young people like the 17-year-olds employed as Stewardship Rangers this summer, people gain a better understanding of the ecosystems “in their backyard” and the benefits of a healthy local environment and urban rivers and streams.
(Below) Paul Willms, Environmental Planner for the City of Cambridge

(Below) Cambridge Environmental Stewardship Trailer
The Mill Creek Rangers worked on the shores of the creek this week where it runs through Soper Park. The crew of five students planted native trees and shrubs and cleaned up the shoreline.
The rangers have been working for two weeks to remove debris causing erosion problems in the creek bed. Creek rehabilitation is an annual exercise for rangers.
# APPENDIX 2 MILL CREEK SCHEDULE 2011

## July 2011

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<tr>
<th>Sunday</th>
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|        |        |         |           |          | 4      | Orientation  
Wader Testing  
Watershed Tour |
|        |        |         |           |          | 5      | Shopping  
Capital Paving |
|        |        |         |           |          | 6      | First Aid 9:5 pm |
|        |        |         |           |          | 7      | Marden Creek  
Hwy. 6 Bridge  
9:30 am |
|        |        |         |           |          | 8      | Capital Paving |
| 10     | 11     | Capital Paving  
(1/2 day)  
& Ed Lake’s  
Orientation  
(1/2 day) | 12 Capital Paving | 13 Ed Lake’s | 14 Ed Lake’s | 15 Ed Lake’s |
| 17     | 18     | Ed Lake’s | 19 Ed Lake’s | 20 Ed Lake’s | 21 Ed Lake’s | 22 Green Legacy |
| 24     | 25     | Jack Imhof Lecture | 26 Capital Paving | 27 Capital Paving | 28 Wellington OSR at  
Mill Creek | 29 GRCA Planning Staff  
Mentor day | 30 |
## August 2011

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<th>Sunday</th>
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<td></td>
<td>Presentation with Lisa Wren 10:30 &amp; ½ day trail clearing</td>
<td>In Class Electrofishing Training (1/2 day) Soper Park (1/2 day)</td>
<td>Soper Park (1/2 day) Work on presentation (1/2 day)</td>
<td>Ed Lake’s (1/2 day) Work on presentation (1/2 day)</td>
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<tr>
<td></td>
<td>Ed Lake’s</td>
<td>Work on Presentation (Rain day)</td>
<td>Soper Park</td>
<td>Ed Lake’s</td>
<td>Ed Lake’s (1/2 day) Nestle Waters Tour 1pm Lunch at Sunset Villa</td>
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<td></td>
<td>Capital Paving</td>
<td>Ed Lake’s</td>
<td>Ed Lake’s</td>
<td>Marden Creek</td>
<td>Tour of Dufferin Lunch at Aberfoyle Mill ½ day at Capital</td>
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<tr>
<td></td>
<td>Capital Paving</td>
<td>Electrofishing Field Day</td>
<td>½ day Capital ½ cutting up gill nets</td>
<td>Finishing touches at Ed Lakes and Capital Lunch at A Change of Pace</td>
<td>Rangers Last Day Inventory of Equipment</td>
<td></td>
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</table>
APPENDIX 3 EQUIPMENT INVENTORY

Inflatable PFD - 4
Work gloves
- Leather: Large - 7, Small - 8
- Water Grip: X-Large: 8, Medium: 7
Hard hats - 5 extras
Safety glasses:
- Yellow tinted - 2
- Clear - 8
Safety vests - 4
Safety cones - 4
Polarized glasses - 2
Flagging Tape - 1 (small roll)
Ear Plugs - lots
Ziplock Bags - lots
Red Insulated 7 L Water Cooler - 1
Green Water Cooler - 1 (missing lid)
WD-40 - ¼ can
Fluorescent Orange Spray Paint - ½ can
Muskol - 7
Sunscreen - 3
Hand Sanitizer - 4
Small Dry Bag - 1
First Aid Kit - 1
Bug jackets - 2

Wader patches - 8 +
Waders
- Size: 5 - 1; 6 - 1; 8 - 1; 9 - 1; 11 - 3; 12 - 2
Wader patch Glue - 1 (flexible plastic)
Wader seam glue - 1 (Goop)

Buckers
Crow bar
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
Multi-bit Screwdriver - 1
T-bar pounders - 4 (1 broken)
Pitch fork - 2
Sledge hammers - 6
Rakes - 5
Shovels
- Long - 7
- Small – 3
- Tiny – 2
- Spades – 11
- Hand Rake tool – 2
- Come-along winch
- Peavey Pole – 1
- Pull saws
  - Good with sheaths – 5
  - Old – 7 (one broken)
- Hand saws
  - Long, Curved – 2 (one handle to be replaced)
  - Long, Straight – 3
- Bow saws – 5 (one is small)
- Spare saw blades
- Pruners - 2

- Fencing pliers – 4 (getting old)
- T-bars
- Earth Anchor 8’ tethers – 1
- Earth Anchor insertion tool – 2
- Earth Anchor driver – 1
- Earth Anchor crimping tool - 1
- Crimps for 1/8" cable – 20 +
- Fencing staples – ¼ large bucket
- Wire – no black 12 gauge malleable
- Wire Cutter – 1