the Downstream View

Hamilton Watershed Stewardship Program

Hamilton Watershed Stewardship Program Newsletter **Fall 2018**

SOIL CARE – Will we make the right choices?

Don Lobb, 2015

Don Lobb's contributions to conservation and the environment have been recognized locally and nationally by many groups: The Soil and Water Conservation Society Honour Award; Conservation Hall of Fame; the Ontario Institute of Agrologists Honorary Life Membership; the University of Guelph Outstanding Service Award; the Environment Canada Environmental Citizenship Award; the A.D. Latornell Conservation Pioneer Award; the Queen Elizabeth II Diamond Jubilee Medal; and the L.B. Thomson Conservation Award by Agriculture and Agri-Food Canada Alumni. Don kindly allowed us permission to utilize this article for this newsletter.

Through the past 10,000 years, history records the successive rise and failure of great civilizations and powerful nations. For example, Mesopotamia (now Iraq), with nearly 20 million people in 3,000 BC, was the most progressive nation in history and then it declined. By 100 BC, Rome had become the most powerful and industrious, but by 500 AD the power of Rome was gone. The decline of these and most civilizations happened for many reasons, but ultimately when their capacity to grow food declined people moved on to new frontiers and fresh soil.

Now – there are no new frontiers! We cannot afford to repeat past mistakes.

The ancients did not carelessly squander their land. It gave them food, wealth and strategic political advantage. Productive soil was a prized possession, yet over the centuries its productivity slipped away. Failure came when agriculture was extended to fragile land, when the cropland water supply failed and when the soil was depleted by tillage-based agriculture. Tillage always removes more from the soil than can be returned. Plato, a Greek citizen and philosopher who tended his own soil, observed that soil building ended and soil erosion began with plow-based agriculture. In 350 BC, plowing was banned on hillsides in Greece.

At this years annual Watershed Stewards Appreciation Day, Lisa Burnside, CAO of the Hamilton Conservation Authority (HCA), and Susan Fielding, Vice Chair of the HCA, presented Jim and Janet Mackey (top) and Rob and Sandra Lloyd (bottom) with Watershed Steward Awards, recognizing their commitment to being good stewards of the natural areas of their properties. Congratulations and thank you for your efforts!

In This Issue

By 1500 AD, farmers in Lowlands Europe – Holland, Belgium and adjoining lands in France and Germany – had learned how to build soil organic matter and improve productivity with the use of plant residues, manures, crop rotation and new plant types such as legumes. In the late 1800s, Charles Darwin recognized the value of earthworms in soil building. Much later, mycorrhiza fungi were recognized as important contributors to nutrient retrieval for plants and for the development of soil aggregates that resist wind and water erosion. All of this contributes to biologically active, healthy, productive soil as well as the soil-building process.

Around 1730, Jethro Tull an English entrepreneur studying plant growth, wrongly concluded that plants grow by absorbing small particles of soil through their roots thus intensive tillage was advocated. The plant-growth response was actually the outcome of nutrient release by bacteria that prefer tillage. However, tillage destroys soil biology, organic matter and aggregates – the entire soil-building process.

Zero tillage (direct seeding or no-till) should disturb as little soil as possible. Zero tillage equipment that aggressively disturbs soil does not contribute to soil conservation nor does vertical tillage or the rotation of tillage practices. All these contribute to soil degradation and tillage erosion. Tillage by itself erodes far more soil than wind and water combined and it does so every year – largely unnoticed – even on gently undulating land. The long-term cost in lost soil productivity is enormous. When net effects are considered, tillage can never be justified. For example, tillage to reduce soluble phosphorus loss results in unacceptable loss of soil aggregates and organic matter that are both essential to sustainable crop production. We should apply best alternatives to tillage. Geomorphologists tell us that the only sustainable way to use soil is to mimic nature. On either the dry grasslands of the prairies or the moist woodlands of the east, undisturbed soil is highly aggregated. This provides strong resistance to water or wind erosion and creates important capacity for water infiltration. The ground is covered with protective plant litter and the soil is stabilized by undisturbed root systems. Undisturbed biota contributes to plant nutrient supply, soil aggregation and soil development.

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PHOTO CREDIT:
KEN TOWLE

Invasive Species Profile: Dog-Strangling Vine, which refers to both the non-native invasive Black Swallowwort *(Cynanchum louiseae)* and Pale Swallowwort *(Cynanchum rossium).*

- **Up to 2m tall**
- **Can produce up to 28,000 seeds per square metre via bean shaped seed pods**
- **Oval leaves with a pointed tip that grow opposite another along the stem**
- **Plant spreads via seed and root fragments, dense vines strangle native plants and small shrubs**
- **Pink to purple star shaped flowers with five petals**
- **Threatens Monarchs, which lay their eggs on the vine, but the larvae are unable to complete their life cycle**

Eradicate small infestations by digging, removing all of the root. Control seed production by removing seed heads, mowing, pulling and/cutting.

The Field Stream

A regular column highlighting landowner efforts to enhance and restore habitat.

Barn Swallow Habitat in West Spencer Creek

Jeff Stock

In 2016, the Hamilton Watershed Stewardship Program (HWSP) was approached by Scott Arbuckle, a landowner in the West Spencer Creek subwatershed with a keen interest in improving the health of the creek on his property. Furthermore, well aware of the Barn Swallows inhabiting his property and their current status, he wanted to enhance the habitat available to them. The Barn Swallow is a bird species designated as “Threatened” in Ontario and is likely to become endangered if action is not taken to address factors threatening it. It has been in significant decline since the 1980’s. Interest such as this to enhance habitat is always welcome news to the HWSP!

The property hosts a variety of flora and fauna, with Barn Swallows known to nest in one of the existing barns, as well as other songbirds in the area and a Midland Painted Turtle that is sighted from time to time. Remnant hedgerow trees surround the property in a warm pastoral setting.

Scott wanted to mimic the barn structure in the adjacent riparian area by the creek, giving the Barn Swallows a new opportunity to nest and further support this species at risk. A significant amount of forage already exists around the farmland and the structure would in itself mimic a hollowed out barn that would allow for multiple locations for the birds to nest. Wooden nest cups would be incorporated into the structure, to ensure durability and minimize any potential nest degradation. The Barn Swallow nest structure is a key action in encouraging population growth.

The structure was contracted out to be built with the support of a grant from the HWSP. Further to this a streamside planting plan was developed with species of native trees, shrubs and herbaceous plants that could manage the creek’s intermittent flooding and compete with the invasive Reed Canary Grass onsite, (along with the occasional mow to keep it down!). The additional diversity of plants introduced to the site would provide even more foraging opportunities with an increased insect population that would follow.

You might notice this curious structure – essentially a miniature hollowed out barn on four beams – standing bright as you drive along Highway 8. This project has been an excellent opportunity to support a species at risk and inspire the public for those driving by that this unusual structure is, in fact, supporting an incredible and dynamic bird. Now you know the story behind this important structure and the uplifting actions of this compassionate landowner.

Photo Credits: Mark Peck

...continued from page 2
Only no-till or direct seeding crop production mimics nature. Farmers have used this practice successfully and profitably. They can actually conserve moisture and build soil through careful management of crop residue.

Soil degradation has always been influenced by water – either too much or too little. In the humid Great Lakes and Eastern Canada region, excess precipitation has resulted in gully formation, serious topsoil erosion and lost productivity. The management of surface water runoff and soil moisture is critical to reducing soil erosion.

On the dryland prairies, moisture shortage contributed to the dust bowl disaster and continues to limit soil productivity in dry cycles. Here, we now benefit from continuous cropping and have learned the real value of crop stubble/residue and wind breaks in trapping snow to retain moisture and reduce wind-induced water evaporation. When experiencing the wet phase of long-term weather cycles, we should not become careless about the need for moisture conservation and protection from the devastation of wind erosion.

The retention of wetlands and potholes can be a nuisance for field activity, however, they add to the water holding capacity of the landscape. The construction of many small headwaters reservoirs can add to this benefit and reduce the need for downstream flood control. Where water is retained there is opportunity to irrigate high-value crops or add productivity to field crop land. This value should be considered as it contributes to overall landscape management.

Dr. David Montgomery, author of DIRT – The Erosion of Civilizations, recounts the sad legacy of tillage-degraded soil during the past 10,000 years. He then points out that “Soil is not lost because we farm – soil is lost because of how we farm.”

As we look forward we must remember that like us, the ancients did have good soil, and they were serious about soil care – and yet they lost it. Today we have tools and knowledge that can allow us to avoid that fate. Will we use them? What will be our legacy to future generations? Will we make the right choices?

Stormwater Stewardship Grants for HCA Watershed Residents!

Stormwater runoff is the root of many water quality issues in our local watersheds.

With increased urbanization comes alterations to drainage, topography and soil, the removal of vegetation, and the use of impervious surfacing (e.g. roofs, pavement and poured concrete). In our traditional stormwater conveyance systems that utilize Combined Sewer Overflows (CSO’s), excess overflow from increased runoff or storm events that carries rainwater, domestic sewage and industrial wastewater outlets directly into streams and rivers untreated.

The best way to lessen the harmful effects of stormwater runoff is to **treat it where it falls** – that means on and around your home! There are a variety of small changes that landowners can make on their own properties to reduce their contribution to stormwater runoff and help to redirect some of the runoff away from the storm sewer system.

We are pleased to announce that the Hamilton Watershed Stewardship Program now has a grant program in place to assist private property owners in the Hamilton Conservation Authority's watershed with stormwater stewardship projects!

Stormwater Stewardship projects can help filter and reduce stormwater runoff flowing into the municipal sewer system, local creeks, Cootes Paradise, Hamilton Harbour and Lake Ontario.

Eligible projects include, but are not limited to:

- $ Bioswales
- $ Infiltration Trenches
- $ Rain Gardens
- $ Water Retention/Storage
- $ Downspout Disconnections
- $ Permeable pavement/concrete/pavers
- $ Soakaway Pits
- $ Riparian Buffers

This grant program received a lot of interest in 2018 and we look forward to offering these grants again, with some potential changes, in 2019. Keep an eye on your email inbox this spring for a funding announcement. If you don't receive our emails but would like to, please contact the Hamilton Watershed Stewardship Program at (905) 525-2181, extension 181 or 196.

Hamilton Watershed Stewardship Program

Parting Ways, Imparting Wisdom

You can't retire from being great.

With warm wishes for what lies ahead and tremendous appreciation for an accomplished career, we respectfully announce the retirement of our Program Manager Sheila O'Neal at the end of 2018. In recognition of her contributions and success, at our Watershed Stewards appreciation day, we presented her with a Watershed Steward Award with the following homage.

Sheila O'Neal has been involved with the Hamilton Watershed Stewardship Program since 1994 when she was hired as a Bay Area Restoration Council Landowner Contact Representative. Her dedication saw her advancement progress from that position to a Landowner Contact/Restoration Technician, then Coordinator of the Hamilton-Halton Watershed Stewardship Program and ultimately, Manager of the Hamilton Watershed Stewardship Program.

It is said that good leaders lead by example. Sheila is a passionate environmentalist and her commitment to caring for the environment knows no boundaries, extends well beyond work hours, and permeates all aspects of her life. Sheila has naturalized the majority of her property, planting a lovely array of native species to encourage biodiversity and the wildlife she so loves. Her naturalization and disconnected downspouts mitigate the impacts her home and grounds have on stormwater runoff. Sheila is extremely resourceful and practical, striving to be as efficient as possible and mitigating her impacts on natural resources and the environment.

In Sheila's career she has met with countless landowners regarding stewardship and environmental awareness, completed many restoration projects, directed significant stewardship initiatives and mentored many staff on the importance of our environment and being a good environmental steward. At her hand and under her direction, the Hamilton Watershed Stewardship Program achieved the following:

- *over 21km of riparian habitat was restored,*
- *over 9 km of in-stream habitat was enhanced,*
- *over 70 km of fisheries habitat has been unlocked, allowing fish the opportunity to access spawning and rearing areas previously inaccessible,*
- *over 200 acres of forested area has been created and or enhanced,*
- *over 30 acres of wetland habitat has been created and or enhanced,*
- *and over 9 acres of prairie and or meadow habitat has been created.*

In addition to creating habitat, these projects and countless others reduced sediment and phosphorus loading, increased biodiversity, enhanced wildlife populations and improved water quality.

Sheila, you have made your mark on the watercourses, wildlife and woodlands of this watershed and the measure of your actions will be felt by generations to come.

Sheila, for all that you do, and all you have done, thank you. You will be missed.

An Autumn Report on Natures Recyclers

Cherish Gamble

In the Stream

My love for benthic invertebrates began years ago, when during a quintessentially Canadian grade school trip to our local outdoor education centre, my eyes meticulously scanned through a benthic sample and rested upon "it". "It" was beautiful. Unlike anything I had ever seen. Its expert craftsmanship an astoundingly contrasting architectural feat amongst the wild assemblage of what lay before me.

"It" was this…

The case of a Net-spinning Caddisfly, *Hydropsyche sp*.

And it was remarkable. This tiny feat of perfection that could withstand what at the time seemed to me a harsh environment (it was years later I would learn about Tardigrades).

Caddisflies, went on to explain the Outdoor Educator, were the aquatic larvae of terrestrial flies known for building elaborate protective cases with silk that they excrete from glands near its mouth. She went on to explain that different species of caddisflies build different types of cases utilizing materials from the streambed they resided in.

This was a VERY pivotal moment in my evolution as a budding young naturalist. More than two decades later when I came to be employed here at the Hamilton Conservation Authority, miles from

where we met, that very same Outdoor Educator, Beth Stormont, was still inspiring kids like me. It's a sweet story of serendipity that I always enjoy retelling.

As a kid, I was fascinated by coarse particulate organic matter (CPOM) in streams, or in layman's terms, the small bits of leaves, twigs and vegetation found dancing and swaying in the current, nestled into the crevices, and at times, lying still beneath the surface like an artifact preserved perfectly in the resin of the river. During excursions to the Nith River with my Dad, I would nestle into a spot and just stare. More so than any other landscape feature, I was fascinated by streams. Looking back I realize it was the diversity of the habitats in these reaches that drew me in. Constantly dynamic micro-pockets whose refresh rate rivaled any video game.

Autumn is my favourite time to sit streamside. Framed by overcast skies and cooler temperatures, the rich hues of fall organic matter draw me in and I whimsically imagine the benthic invertebrates happily devouring this fall feast.

It was in college that I went on to learn more about benthic invertebrates, the role they play in nutrient cycling and the breakdown of CPOM in streams, and their functional feeding groups:

- There are the "grazers"/scrapers" that use their raspy mouthparts to feed on the biofilm (the assemblage of bacteria, algae and fungi that adhere to rocks and vegetation) like snails and certain species of caddisfly and mayfly larvae.
- The "shredders", certain species of cranefly, caddisfly and mayfly larvae inhabit the stream bottoms and shred apart leaves as they feed with their tearing mouthparts - some caddisfly species use these torn bits to construct their cases.
- The "collector/gatherers", certain species of stonefly, mayfly and caddisfly larvae who wander the stream bottom and scavenge decaying organisms and vegetation that come to rest in crevices and calmer areas.
- The "filter feeders" like amphipods, midge larvae and mussels, as their name implies, filter out particles in the current.
- The "predators" feed on other insects, tadpoles and even small fish both in the larval and adult stages. Water beetles, dragonflies and dobsonflies are all voracious predators.

A dragonfly nymph with a stickleback fry. Source: http://www.isleofharris.com

Recycling at its finest. These benthic invertebrates play a huge role in processing CPOM. As streams flow from their headwaters to their mouth, the benthic invertebrate communities change predictably. Densely vegetated low order streams are typically dominated by shredders which break down the vegetation into fine organic particulate matter (FPOM). As you move downstream, channels typically widen, the input from surrounding vegetation is less abundant in relation to stream size, and the available sunlight increases. Subsequently these higher order streams favour scrapers and collectors to feed on biofilm and decaying matter, and large rivers and creeks at the highest orders are commonly frequented by collectors to feed on the FPOM. This framework is known as the River Continuum Concept (RCC) in natural systems.

At any point in this system, the limiting factor is the energy the stream possesses. So elaborately intertwined are these processes that the stream is always striving to be as efficient as possible. Even with daily and seasonal changes, a natural system continues to operate as efficiently as possible and any natural disturbances or fluctuations that occur as a result of these changes are mitigated and a new balance achieved.

In a natural system, natural gradient changes cause changes in flow, sediment and organic matter input and riparian vegetation but balance is maintained. When we tamper with organic inputs, flows, gradients and vegetation, the equilibrium is lost and the diversity and species richness of aquatic invertebrates present is affected.

Aquatic invertebrates aren't able to quickly escape pollution events - they live most of their lives in the water, and are directly affected by stream conditions. Some species, like water pennies (at right) and dobsonfly larvae, require high levels of dissolved oxygen and a decline in their abundance over sampling years could indicate pollution. Other species like black fly larvae, which obtain oxygen from the surface of the water, are less dependent upon dissolved oxygen in the water column and can tolerate poor water quality conditions.

This makes aquatic invertebrates excellent indicators of water quality. They are the 'canaries in the coal mines' of streams if you will. Regular sampling of benthic invertebrates in streams is inexpensive and easy, and when combined with other sampling protocols like water quality monitoring and electrofishing, aids in assessing the health of a system. So the next time you look into your local stream think about the complex community that exists within it.

What Not to do with Raked Leaves

There is a common misconception that our streams, ravines and natural areas are the perfect spot for dumping raked leaf litter, garden cuttings and compost piles. More leaves in the natural area and creek equals more food for benthic invertebrates which equals more fish right? And hey, it's biodegradable so it must be ok! Right?

Wrong.

Unlike the City of Hamilton, the municipality that I live in does not have regular compost or leaf pickup. I watch my neighbours make their wheelbarrow pilgrimages down to the river and what I have dubbed the "pile of shame" is overwhelming the banks. Week after week, year after year they return, oblivious to the damage the pile is causing.

A compost pile along the banks of Chedoke Creek causes erosion and unstable slopes.

The unnaturally deep piles of leaves and vegetation have smothered out the many spring ephemerals along the top of bank, a bank which erodes more and more every year without the roots of native vegetation to hold the soil in place. Consequently, on the other side of the well worn wheelbarrow path and above the high water mark, a garden cutting of non-native invasive Japanese Knotweed has taken hold, further threatening our native plants. Years and years of rotting vegetation have built up and the ground is unstable. Piles of leaves and vegetation along and in the water sit rotting, the excess nutrients leaching causing increased algal growth which has detrimental effects on dissolved oxygen in the stream.

On land, just as in the water, in a natural setting nature's recyclers maintain a fine balance to recycle nutrients back to the earth. Detrivores like beetles feed on large parts of naturally fallen decaying plants, leaving behind their own waste materials and smaller organic material for the decomposers like bacteria and fungi. Their consumption of leaves and other vegetation results in the breakdown of simple organic compounds into carbon dioxide (CO_2) and water (H_2O), and discharges nutrients like nitrogen and phosphorus back to the soil where the plants will reuse these nutrients. The decomposition of naturally fallen leaf litter is crucial to the nutrient cycling that supports forest ecosystem health.

These decaying leaves become part of the top layer of the soil, known as the O horizon (O for organic). And just like in streams, the amount of organic material in the system is indicative of the productivity of the ecosystem. The O layer is highly variable depending upon factors like species of vegetation present, temperature, thickness, latitude and decomposition rate.

In addition to providing the autumn harvest for nature's recyclers, leaf litter where it falls naturally protects the underlying soil from erosion. Left unprotected, the impact of rain drops on bare soil can detach soil particles and carry them away, causing erosion on land and in water.

The layer of fallen leaves that blankets the forest floor provides habitat, food and shelter for a multitude of creatures, including mammals, insects, reptiles, amphibians, birds and even plants! Many seeds germinate in this layer. Locally, some vulnerable species rely on this habitat and clearing or disturbing the organic layer from the forest floor can negatively impact these species.

In addition to hunting insects amongst the leaf litter on the forest floor, the female Ovenbird weaves dead leaves, grasses, stems and bark together to create a nest on the forest floor. Ovenbirds are sensitive to habitat fragmentation and require large undisturbed mixed and broadleaf forests specifically mature hardwood forests. Their populations have been steadily decreasing.

An Ovenbird.

Locally, there are many species of reptiles and amphibians that utilize leaf litter. Many of them are very sensitive to changes in their environment, and that environment is changing rapidly. Although small in size, our local salamanders are an important part of our forest biomass, and as predators of microinvertebrates and prey for larger wildlife, they are considered a 'keystone species'. A keystone species plays such an important role in an ecosystem that their removal or decline has a negative impact on other species. Leaf litter is crucial to Salamanders - they utilize it, either directly, or indirectly, for all of their life processes: foraging, shelter, breeding and even hibernating.

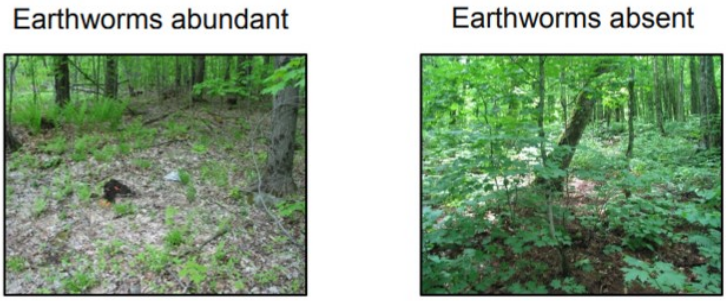
So this fall, encourage friends and neighbours who may rake more than they need to, to put the rake down, and for the sake of the forest leave the leaves.

WormWatch

Researchers are studying the impacts that climate change, habitat degradation and loss, and invasive species are having on terrestrial ecosystems and keystone species. For some species, their very existence is quite literally on the finish line of this race against time. It's about balance, and that balance has been achieved through evolution. Our native species, from bacteria to bats, microbes to mammals, have grown, persisted and co-existed alongside each other since the end of the Wisconsin glaciation, almost 11,000 years ago. 11,000 years! Relationships well forged and complex webs of interdependency, symbiosis and support between all life. Biodiversity and the processes that support it, truly brilliant!

During the Wisconsin glaciation earthworms were scoured from existence in Ontario, as a result, our forests and the ecological processes that sustain them evolved without the presence of earthworms. Currently there are 19 species of earthworms in Ontario, 2 of which have migrated from the U.S. and the others from Europe. Now, I don't know about you, but my dirt escapades began in the garden, where earthworms were good. They aerated the soil and accelerated the rate of decomposition of organic matter in the garden. They were good for the garden... for gardens, for man-made, maintained gardens… not for forests.

Not for forests.



Source: Earthworms in Forests, University of Vermont

In our forests, earthworms eat the leaf litter and organic layers, which changes the physical and chemical composition of the organic layer, creating less favourable conditions for plant growth. The moist leaf litter is replaced with their secreted castings, which are coated and therefore drier and prone to erosion. Their presence causes imbalances in the abundance of bacterial and fungal populations and soil health and plant populations are adversely affected. Recent research is showing that they also are capable of ingesting small seeds, and may be further impacting plant populations. At one of my favourite fishing spots, I've been noticing over the past several years a decline in the understory vegetation, leaf litter and salamanders and I realize now it is probably a result of introduced earthworms, unused bait cast aside crawling amuck. Scientists are racing against the clock to determine how the presence of earthworms may also be affecting our imperiled keystone salamanders.

wormwatch
ENGAGING CITIZENS IN SCIENCE

When you consider the slow and careful evolution of our natural areas, they are currently facing rapid and catastrophic stresses. It is past time to carefully evaluate our relationship with and interactions with nature. Learn more about earth worms and how you can participate in the citizen science monitoring program by visiting www.naturewatch.ca.

Scheduling a Stewardship Check-up

When was the last time you had a visit with one of our Stewardship Technicians? With increasing pressures from urbanization, invasive species and climate change, our natural spaces and wild faces rely on privately owned natural areas for food, shelter and water. Site visits are free and our staff can help identify natural features on your property and provide recommendations on how you can ensure you are providing the best quality habitat possible. We can:

- provide technical information on how to combat invasive species,
- check your woodlots for signs of forest pests and pathogens,
- assess your creek reach to help combat erosion and improve fisheries habitat, and
- tell you how your water quality or wildlife habitat improvement project may be eligible to receive funding through our program

For more information, or to book a site visit, please contact us at:

Hamilton Watershed Stewardship Program
Phone: (905) 525-2181 ext. 181, or ext. 196
www.hamiltonhaltonstewardship.ca

Giving Thanks to our Funders!

Thank you to our funders!

Hamilton Conservation Authority provides core funding for stewardship program and grant support for landowners to assist with the cost of water quality and habitat improvement projects.

Hamilton Conservation Foundation receives donations for and provides grants to support the stewardship program's landowner outreach and education.

City of Hamilton provides grants to landowners through the stewardship program to assist with the cost of abandoned well decommissioning projects.

Province of Ontario's Canada – Ontario Agreement through the Ministry of Natural Resources and Forestry supported Spencer Creek watershed landowner outreach focused on promotion of best management practices to improve water quality in rural and urban watersheds.

Environment and Climate Change Canada through the Great Lakes Sustainability Fund supports stewardship landowner outreach, education, project negotiation and implementation in priority subwatersheds to improve water quality and habitat in the Hamilton Harbour watershed.

RBC Blue Water Project supported landowner education focused on the importance of increasing stormwater infiltration at the lot level using low impact development techniques to improve quality of stormwater entering valleys, creeks and wetlands.

Canon Canada Inc. not only supported the cost of planting projects in the Hamilton Harbour watershed but Canon's staff volunteered their time and energy becoming actively involved in the implementation of in the ground projects.

Environment and Climate Change Canada
Environnement et Changement climatique Canada