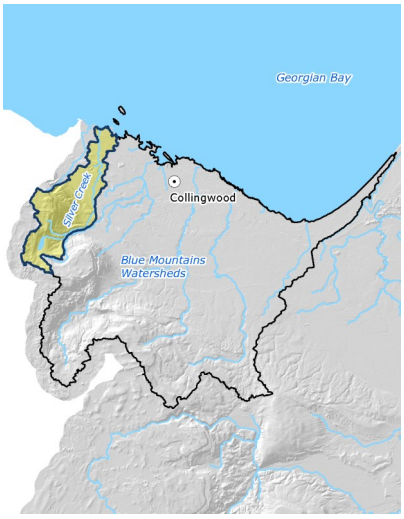
Blue Mountain Watershed Trust Foundation

Silver Creek Watershed

2016 Watershed Health Check

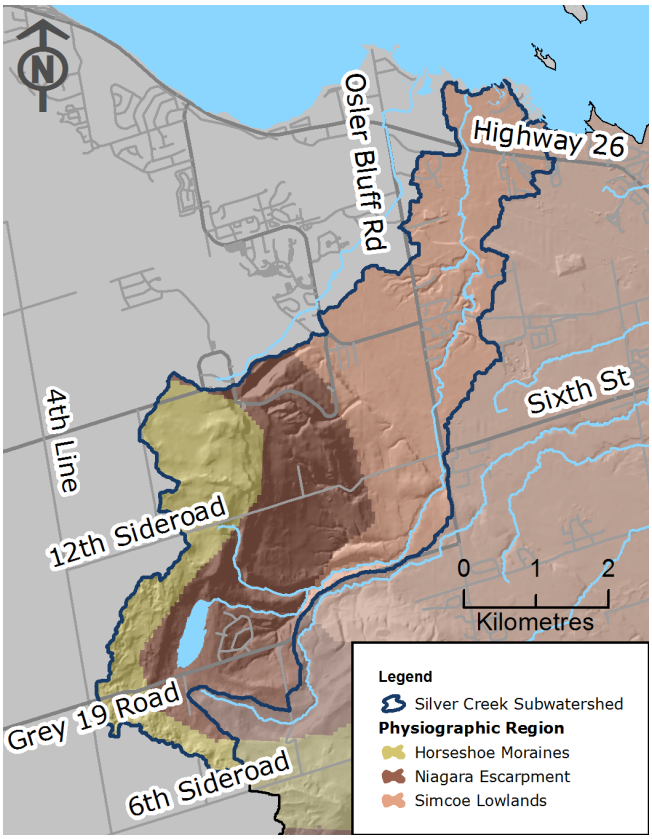
2016 Health Check Results:

- **Forest Conditions: Very Good**
- **Wetland Conditions: Good**
- **Stream Health: Good**
- **Groundwater Health: No Data**



This Health Check describes the health of forests, wetlands, streams and groundwater within the Silver Creek watershed. It identifies stewardship priorities and programs to improve environmental health. Healthy ecosystems sustain healthy communities – future challenges and opportunities for the watershed community are outlined.

Silver Creek originates on the Niagara Escarpment – a World Biosphere Reserve.



Silver Creek arises as a set of spring-fed tributaries on the Niagara Escarpment near Castle Glen. Permanent flows begin upstream of Lake of the Clouds, fed in part from karst (sinkhole) features on the Horseshoe Moraines above the Escarpment.

At Lake of the Clouds, the headwaters are impounded behind a large dam before cascading downstream through forested Escarpment terrain. Neff Creek adds to Silver Creek flows in the Escarpment zone, , joining the main creek near County Road 19. Forest cover throughout the Escarpment is dominated by Sugar Maple with red oak along the slopes and regenerating forests throughout. Rich sugar maple forests support spring ephemerals vegetation such as Trilliums and Yellow Trout-lily. The substrate in Silver Creek on these steep Escarpment slopes consists of gravel, cobble and boulders. Log jams are common.

Silver Creek enters the Simcoe Lowlands near Osler Bluff Road, flowing northward through a mosaic of forests, wetlands, farm fields and rural residential areas before entering a large coastal wetland and discharging to Georgian Bay (West Black Bass Bay) north of Highway 26. As the slope and velocity decrease through this section, meanders are formed and the substrate changes to gravel and clay with occasional cobble. These meanders and rocks create riffles and pools, which provide excellent fish and benthic invertebrate habitat.

Development pressures are present in the Silver Creek watershed. Future development is planned in the Castle Glen area near Lake of the Clouds. Urban development is also in various planning stages within the Town of Collingwood and Town of Blue Mountains. Agricultural threats are also present with livestock having full access to Silver Creek and associated forests and wetlands south of Highway 26. Rural-residential land use can also impact Silver Creek through excessive use of fertilizers, removal of vegetative buffers and poorly-maintained septic systems.

The **Blue Mountain Watershed Trust's** mission is "to preserve and enhance the Blue Mountain Watershed Ecosystem". This mission is carried out by raising public awareness about our natural heritage and associated threats. We contribute to science and protection through water quality monitoring and engaging with various levels of government, local landowners and the development community. For more information check out our website:

www.watershedtrust.ca

Watershed indicators rating scale:

very good	good	fair	poor	very poor

Forest Conditions

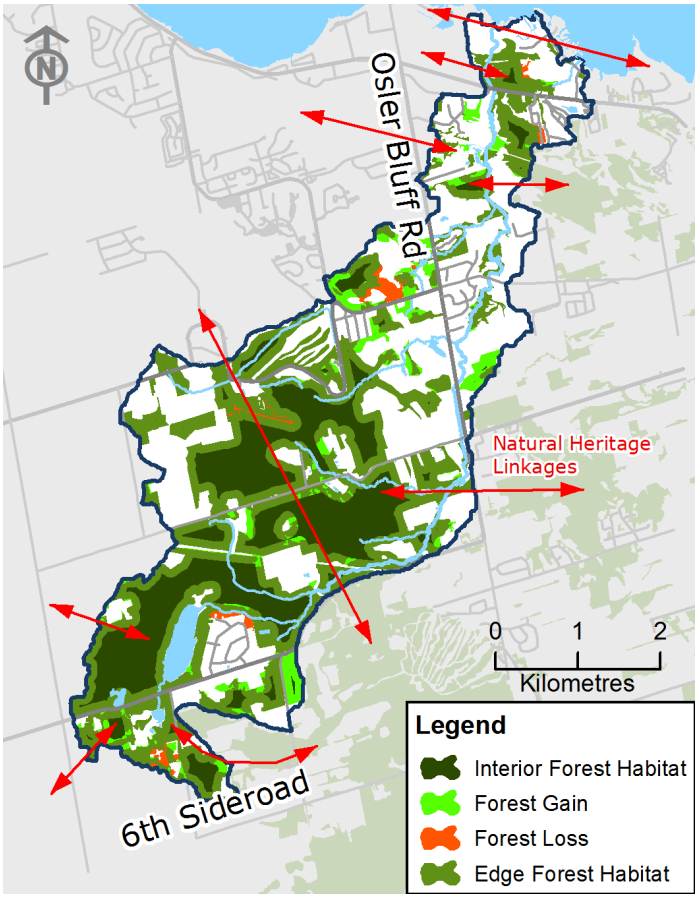
Status: Very Good
Trend: Improving

The Silver Creek watershed supports healthy forest cover. Large forests provide significant habitat for wildlife species that require undisturbed, deep forest habitat to thrive.

Large forests are common within the Niagara Escarpment headwater areas. Southeast of the Escarpment, forest cover is fragmented in the Simcoe Lowlands above the ancient Nipissing shoreline ridge. North of the ridge, forest cover (mixed with wetlands) is re-established and extends to Georgian Bay. At present, non-forest cover in the watershed is dominated by agricultural land use with smaller pockets of residential development.

Recent forest analysis undertaken by BMWT indicates that a significant portion of forest cover is relatively young and is regenerating from past land use—likely livestock grazing. Forest cover is no doubt significantly greater in extent today compared to conditions in the first half of the 20th century.

A provincially rare cedar cliff/talus forest with crevices and caves is present at Scenic Caves. The rich Escarpment forests support a number of rare plant and animal species including Hart's-tongue Fern and Louisiana Waterthrush. Coniferous and mixed forests provide locally important winter habitat for deer.



Headwater forest cover forms an integral part of the Niagara Escarpment natural corridor. This forest cover is also connected to nearby forests and wetlands within the Beaver River Valley to the west as well as other Blue Mountain Watersheds to the south. Lowland forests/swamps along the Collingwood shoreline are connected to similar shoreline forests to the west (Town of Blue Mountains). The shoreline itself is part of an important corridor for migrating waterfowl and shorebirds.

Based on satellite photo interpretation, between 2008 and 2016 there was a net increase in watershed forest cover of 107 ha. Forest gain was associated with forest regeneration while loss was associated with urban/ residential and recreational property development. This forest gain is also associated with improving forest interior and riparian cover indicators.

Indicators	Silver Creek	Blue Mountain Watersheds (NVCA portion)	Indicator Description	Trend (2002-2008)
Forest Cover	**56.1% (1287.5 ha)**	**31.5%**	Forest cover is the percentage of the watershed that is forested. Environment Canada suggests that **30% forest cover** is the **minimum** needed to support healthy wildlife habitat; more coverage is beneficial.	↑ +107 ha
Forest Interior	**17.8% (409.2 ha)**	**7.9%**	Forest interior is the area of forest that lies more than 100 m from a forest edge – away from the windy, dry conditions and predators that are associated with the edge. Sensitive forest birds, mammals, reptiles and amphibians require deep forest habitat for survival. Environment Canada suggests that **10% forest interior cover** is the **minimum** needed to support a range of species.	↑ +95 ha
Riparian Cover	**76.4% (255.0 ha)**	**67.1%**	Streamside forest cover (riparian vegetation) filters pollutants and provides important fish and wildlife habitat. Environment Canada suggests that at least **30 m on each side of the stream** (over 75% of its length) should be in natural cover to support healthy streams.	↑ +75 ha

Ratings: very good | good | fair | poor | very poor

Wetland Conditions

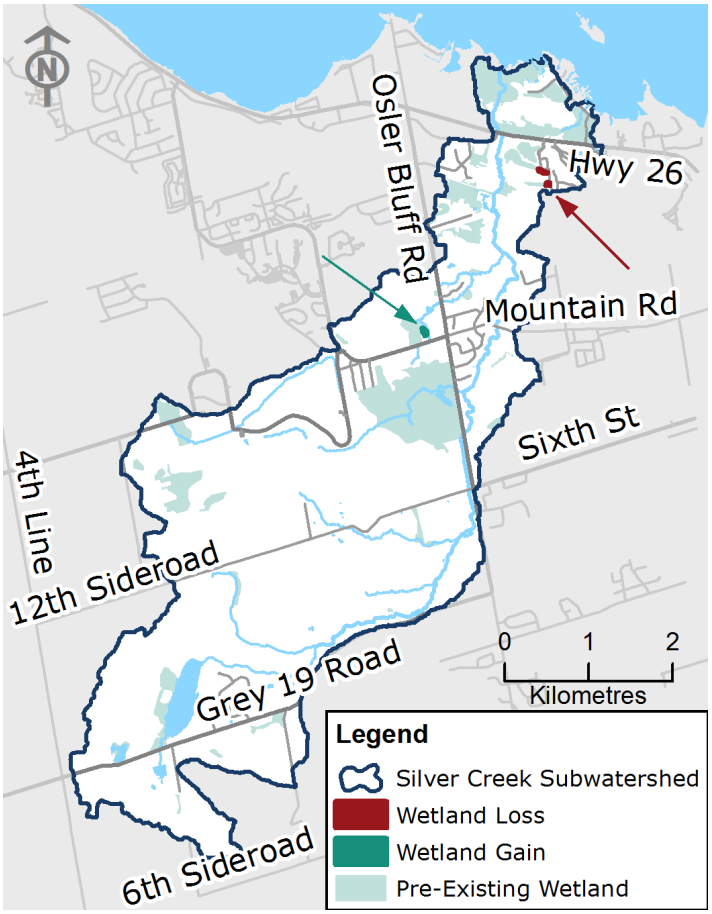
Status: Good
Trend: Declining

Wetlands play an important role in the ecological health of a watershed. They improve water quality by filtering runoff from agricultural and urban areas. Wetlands hold back water on the landscape, which controls flooding, reduces erosion and helps maintain stream flows during dry periods. The wetlands in the Silver Creek watershed provide habitat for a rich variety of flora and fauna.

Wetland cover in the watershed is good compared to Environment Canada habitat guidelines. A fair amount of natural cover is generally present around these wetlands which provides important habitat for wildlife species which require a variety of upland and wetland habitats to survive. However, a declining trend in nearby natural cover has been observed.

Several wetlands are found above the Escarpment near Lake of the Clouds. A mosaic of regenerating wetlands is present in the Simcoe Lowlands off Osler Bluff Road. Shoreline wetlands and lowland forests are present along the Georgian Bay shoreline near the mouth of Silver Creek.

Coastal marsh wetlands, formed over shallow-sloped limestone bedrock from Highway 26 north to Georgian Bay, support rare vegetation communities (rich fens) that are found only along the Great Lakes – and nowhere else in the world! These rare wetlands are maintained by naturally-fluctuating water levels in Georgian Bay and by the low nutrient shoreline environment.



The Silver Creek Wetland Complex has been identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry. Provincial and municipal planning policies help protect these wetlands from development and site alteration. A number of unevaluated wetlands could be added to the evaluated Silver Creek Wetland Complex. Other unevaluated wetlands should be evaluated for significance.

Recent Ducks Unlimited Canada data pegs historical wetland loss in the (former) Collingwood Township – the largest pre-amalgamation municipality within the watershed – at 40.9%. Wetlands in the Silver Creek Watershed appear relatively intact compared to other Blue Mountain Watersheds which have been impacted by urban development and agricultural conversion.

Based on satellite photo interpretation, between 2008 and 2016 there was little change in wetland cover with minor loss associated with urban/residential development and minor gain as part of a wetland creation project.

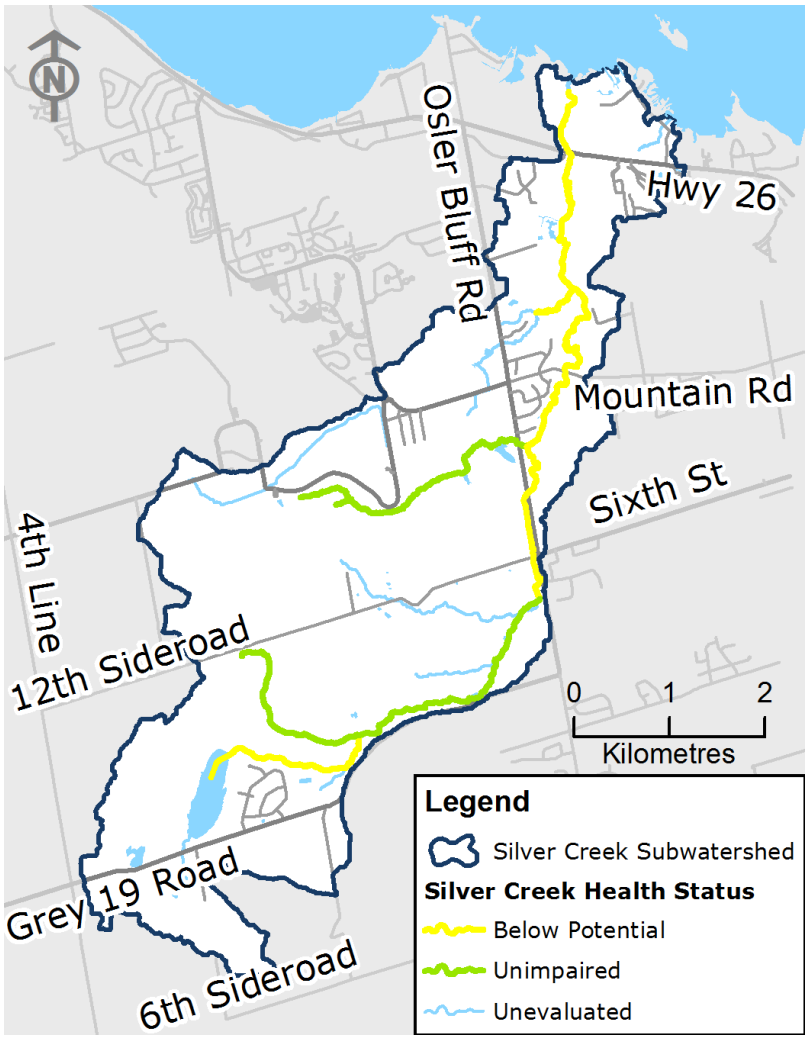
Indicators	Silver Creek	Blue Mountain Watersheds (NVCA portion)	Indicator Description	Trend (2008-2016)
Wetland Cover	**10.8% (249.0 ha)**	**5.7%**	**10% wetland cover** has been identified as a **minimum** guideline for healthy watersheds (Environment Canada).	↔ (-0.1 ha)
Wetland Buffer (100m buffer area)	**55.8% (263.2 ha)**	**52.7%**	A buffer is a vegetated area next to a wetland or stream. Many wetland wildlife species require nearby upland areas for foraging, nesting and other activities.	↓ -9.8%

Stream Health

Status: Good
Trend: No Trend

Surface water quality and stream habitat in the Silver Creek watershed ranges from "below potential" to "unimpaired". Productive trout habitat is found from the Silver Creek headwaters downstream to Georgian Bay (Escarpment to Bay). Migratory trout and salmon can ascend upstream to Lake of the Clouds and can spawn throughout this part of the system. Native brook trout are present in Neff Creek and the headwaters of Silver Creek.

The spring-fed Escarpment headwaters provide a high quality, healthy source for Silver Creek and Neff Creek. Healthy conditions persist through the forested riparian (streamside) habitats of the Escarpment zone. Coldwater (trout) habitat persists in Silver Creek downstream of the Escarpment. Improvements to streamside habitat (tree planting) and streamside land uses (livestock fencing) downstream of the Escarpment would benefit stream health in the middle and lower reaches of Silver Creek.



Water quality monitoring undertaken as part of a partnership between BMWT and NVCA at Highway 26 indicates that nutrient concentrations are low during baseflow periods, attesting to the generally healthy character of Silver Creek. Bacteria (*E. coli*) levels in Silver Creek fluctuate throughout the summer months – swimming outside of regularly monitored beaches should be undertaken at your own risk.

Steep slopes and erosive soils associated with the Escarpment slopes pose a significant challenge for land development and road works. Sturdy sediment and erosion control (regularly maintained) followed by revegetation and other forms of restoration are required to minimize movement of soils into Silver Creek and its tributaries and thereby minimize impacts to stream health.

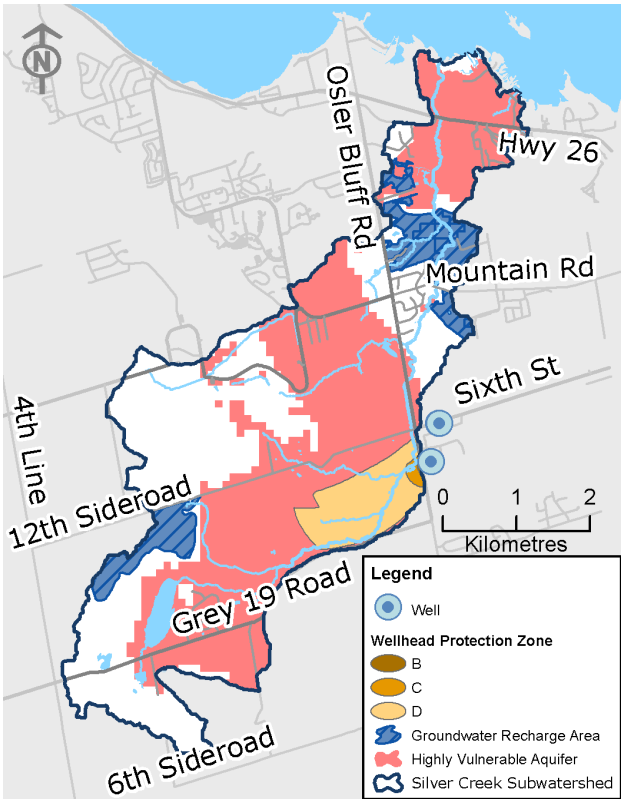
Indicators	Silver Creek Watershed	Indicator Description	Trend (2007-2012)
Benthic Grade	**2.0**	Insects and other "bugs" that inhabit the streambed are excellent indicators of stream health. Healthy streams receive a score of "3" while unhealthy streams receive a score of "1".	↔
Total Phosphorus (low flow; mg/L)	**0.01**	Total phosphorus indicates nutrient levels within a stream. Our healthiest streams have levels less than 0.01 mg/L during low flow conditions. During storm events NVCA streams often exceed 0.03 mg/L (Blue Mountains range: 0.002—0.765 mg/L). Provincial Water Quality Guidelines suggest that **levels greater than 0.03 mg/L result in unhealthy stream conditions.**	↔
E. coli (low flow; coliform-forming units/100mL)	**72**	*Escherichia coli* bacteria are found in human and animal waste. They naturally occur in our streams but higher levels may indicate fecal contamination. Ontario Recreational Water Quality Guidelines suggest that waters with less than 100 CFU's/100 mL are safe for swimming. *E. coli* is not closely tied to stream health. *This data is presented for general public information only.*	Insufficient Data

Ratings:	very good	good	fair	poor	very poor

Groundwater

Status: Data Not Collected
Trend: Data Not Collected

Groundwater is water that is stored underground in bedrock fractures or between sand/gravel grains in aquifers. Groundwater sinks into the ground from rain or snowmelt — including through karst sinkholes on the Escarpment near Lake of the Clouds — then moves to spring and seep discharge areas, which feed streams and wetlands. Conversely, groundwater may move downward into deeper aquifers. Aquifers may be separated by layers of fine-grained silts or clays (aquitards) that tend to block the downward movement of water. Aquifers located below aquitards are often protected from potential surface contamination and are preferred for drinking water sources.



Groundwater sustains stream flow and wetland levels during dry spells. It supports a variety of human uses including municipal water supplies, private water supplies and agricultural irrigation. More than 130 municipal wells and 10,000 private wells are located within the Nottawasaga Valley Conservation Authority watershed. These wells provide drinking water for most watershed residents.

The Escarpment is made up of limestones and dolostone (carbonate rocks) which dissolve from the natural acidity of water. This dissolving rock forms karst topography including caves and crevices that are abundant on the Niagara Escarpment. The water that drains down through the rocks emerges at a lower level as seeps or springs which feed coldwater streams such as Silver Creek.

Ontario's Source Water Protection initiative is focused on protecting municipal drinking water sources. Key areas of interest include 1) Wellhead Protection Areas (areas that drain down toward municipal wells), 2) Highly Vulnerable Aquifers (generally where groundwater lies close to ground surface) and 3) Significant Groundwater Recharge Areas (which feed our aquifers). Nitrates from septic systems and fertilizer use, *E. coli* from various sources, and sodium and chloride from road salting are potential sources of contamination.

Through the Provincial Groundwater Monitoring Program (PGMN) partnership with the Ministry of the Environment, the NVCA monitors water levels and water quality in 19 wells annually since 2003 within the watershed. However, there are currently no PGMN wells within the Silver Creek Watershed. NVCA continues to work with the province and member municipalities to improve PGMN coverage where feasible.

Indicators	**Silver Creek Watershed Monitoring Well Results***			**Indicator Description**
	Shallow (0 wells)	**Intermediate** (0 wells)	**Deep** (0 wells)	
Chloride (mg/L)				Chloride occurs naturally in the environment; however, high concentrations can indicate human impacts (e.g. road salt, landfills). The Canadian guideline for chlorides in drinking water is **250 mg/L** and is based on aesthetic objectives. Drinking water should not exceed this level.
Nitrite & Nitrate (mg/L)				Naturally occurring forms of nitrogen can be found as nitrites and nitrates in groundwater. High concentrations of this element can be related to human activities (e.g. excessive fertilizer application, failing septic systems). The Ontario (and Canada) standard for nitrite and nitrate (as nitrogen) is **10 mg/L**. Drinking water levels should not exceed this level.

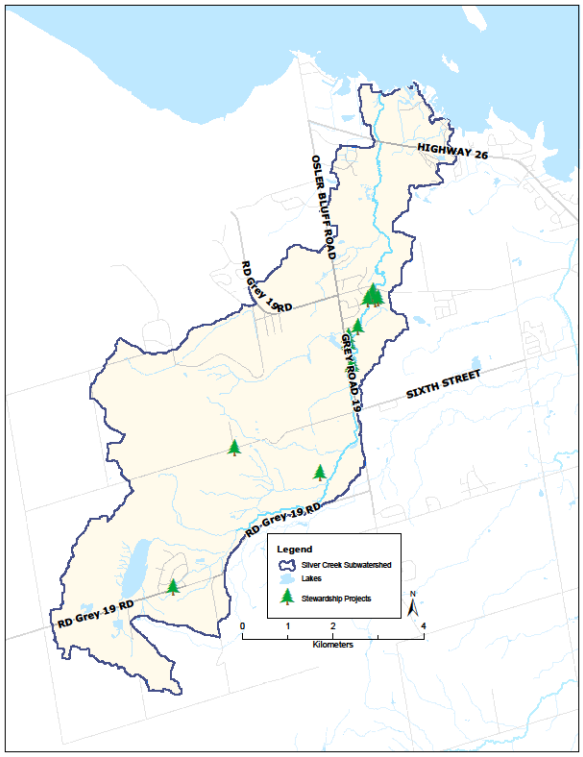
Well types are classified by their depth below ground in meters: Shallow (0-20 m); Intermediate (21-60 m); Deep (>60m). ***Results reflect health at the well and should not replace testing at private wells.** Baseline data for groundwater health will be presented in the 2018 Health Checks (8-10 years of data is required to analyze trends).

Watershed Stewardship

Working Together to Protect and Restore Get involved!

Watershed Stewardship is the responsible and sustainable care of our natural resources and wildlife within a watershed. As caretakers of our environment, we need to implement stewardship practices that protect and restore natural resources. (Conservation Ontario)

Almost **98% of land in the Silver Creek watershed is privately owned**. We all depend on good private land stewardship to achieve healthy waters and sustainable ecosystems. To assist landowners in the Silver Creek Watershed to protect the environment, the BMWT provided a range of technical assistance and promoted various grant incentives to help offset the cost of projects on private lands. For example, grant rates for the various NVCA Healthy Waters Programs range from 25% to 95% of eligible project costs.



The Silver Creek Stewardship Initiative

The BMWT spearheaded the Silver Creek Stewardship Initiative in 2016. The objectives of the year-long Initiative were to build positive relationships with landowners adjacent to Silver Creek and educate them on environmental issues related to watershed health, locate areas in need of restoration and to study the watershed by reviewing water quality data and vegetation types.

Over the course of 6 months the Project Manager of this Initiative met with **44 out of 104 landowners** within the Silver Creek watershed and assessed **49 properties**. While on site, landowners were educated about their property ecology, Silver Creek and best management practices. Some topics included: septic systems, wells, invasive species, fertilizers and water conservation. By meeting with landowners on their property the Project Manager was able to explain the impacts some activities can have on Silver Creek and provide alternatives. Getting to know each landowner and their objectives, as well as respecting the knowledge they have about their properties and local history has created a sense of ownership towards Silver Creek. Landowners that participated in this consultation received a plaque for their property to recognize them as stewards of Silver Creek.

Properties that were eligible for Creekside habitat restoration received technical advice and financial support. During the first week of October 2016, **353 trees, shrubs and wildflowers** were planted by **30 Collingwood Collegiate Institute science students.** These plants have enhanced **200 meters** along Silver Creek and will help stabilize banks, improve fish and wildlife habitat and decrease nutrient runoff. Additionally, 1 kilogram of wildflower seed was added to an eroding Escarpment ditch, which will add pollinator habitat and minimize erosion.

NVCA Stewardship in the Silver Creek Watershed

Prior to the Silver Creek Stewardship Initiative, two landowners within the watershed were involved with the NVCA Healthy Waters Program. One landowner had extensive tree planting done to help shade the creek and rock weirs were created to increase oxygen levels and spawning habitat. The second landowner had an eroding bank stabilized using rock materials. These projects highlight the importance of having riparian vegetation for stability and habitat.

Congratulations to our Watershed Stewards in the Silver Creek Watershed!

Every spring, armed with gloves and garbage bags, members of The Nature League gather on the Bruce Trail for their annual Garlic Mustard Pull. They recognize the damage that the invasive garlic mustard herb has on the forest floor and the value of 'many hands.' Members pull together to slow its spread. Dedicated to conserving and protecting the environment, they host nature events and support partners through fundraising.

This is only <u>one</u> of the many community champions that are helping to improve watershed health!

Forest, wetland and stream conditions in the Silver Creek watershed are in fair condition. The major land use that would alter conditions is increased development in the watershed. There are still some stewardship opportunities to preserve Silver Creek water quality and enhance fish habitat between the Escarpment and Georgian Bay for both businesses and private landowners. Escarpment properties should focus on retaining mature forest cover and controlling sediment runoff. Private landowners in the Simcoe Lowlands should increase their riparian buffers and practice environmental lawn care, as well as working to update septic systems.

Healthy Waters Depend on All of Us

Key Actions to Improve Habitat & Water Quality:

- Protect and create stream and wetland "buffers" – areas of natural vegetation between the water and adjacent land use practices
- Plant trees along streamsides and stabilize eroding steam banks
- Implement agricultural best management practices to reduce nutrient, sediment and bacteria runoff
- Reduce the spread of invasive species and pathogens

Urban Water Quality & Quantity:

- Conserve water in the home and garden
- Use rain barrels, mulch and rain gardens
- Reduce or stop use of fertilizers
- Don't pour anything down storm drains – these drains often flow untreated into local water bodies

Habitat Enhancement:

- Plant native trees, shrubs, wildflowers and grasses to support birds, butterflies and other wildlife
- Learn to identify and remove invasive species

Protect Your Drinking Water – Well & Septic Care:

- Decommission unused wells to prevent surface contaminants from reaching groundwater
- Test your well for bacteria at least 3 times per year (your local health unit provides **free** testing)
- Regularly service your septic system (every 2 to 5 years) and avoid using products that kill beneficial bacteria, which aids in the breakdown of septic waste

Agricultural Best Management Practices:

- Upgrade manure storages and divert clean water from pastures and barn yards with eaves and berms
- Improve stream health by fencing out livestock
- Buffer streams from cropland and pasture (5-30m)
- Reduce soil erosion through conservation tillage, residue management and use of cover crops
- Reduce nutrient runoff (and save money) by implementing nutrient management planning
- Use water conservation measures and work with neighbours to coordinate water takings

How You Can Make a Difference

- Undertake stewardship projects on your property
- Volunteer at community stream and habitat restoration work days and events
- Participate in citizen science (e.g. amphibian and breeding bird monitoring)
- Donate funds for land conservation or habitat and water improvement projects
- Become a member and join a local Field Naturalist group
- Attend community workshops – learn about your local environment
- Manage your forest and receive tax benefits – check out the Managed Forest Tax Incentive Program
- Donate your lands as a living legacy – contact the NVCA to learn more
- Stay informed about upcoming events – check us out on Facebook and Twitter

Healthy Ecosystems, Healthy Communities

Our Watershed Ecosystems Benefit Us All

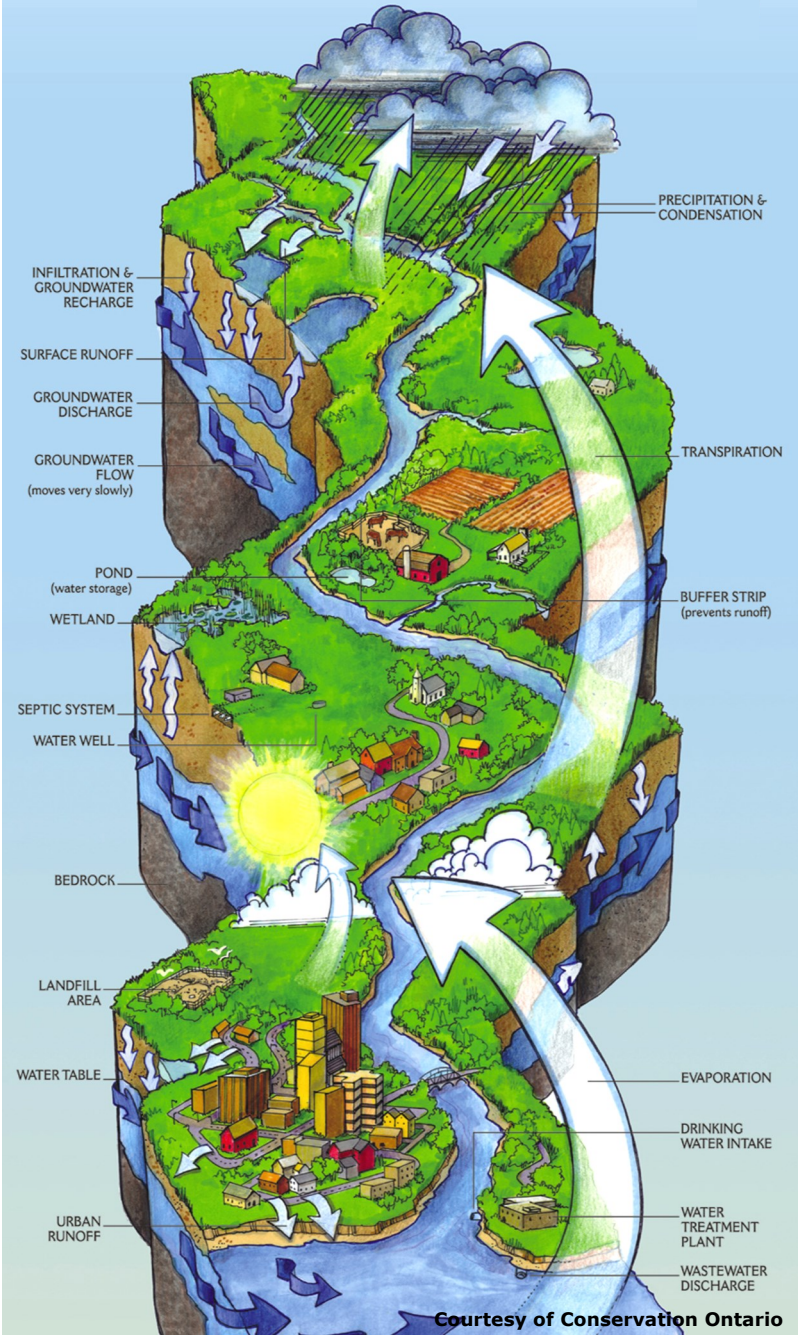
A healthy natural heritage and water resource system is the foundation of a high quality sustainable community. Often these services are overlooked and undervalued. The ecosystem services provided by our lands and waters include:

- healthy agriculture
- clean drinking water
- waste assimilation
- fish and wildlife habitat
- climate stabilization
- flood and erosion control
- forest products
- spiritual and inspirational values
- recreation and ecotourism

Ecosystem services will become even more important as urban growth continues in the Silver Creek Watershed. This will bring large numbers of new people into our community with expectations for healthy landscapes and streams, clean drinking water and opportunities for recreation.

New growth represents challenges and opportunities for us as a watershed protection organization. Water resources, including stormwater and wastewater, must be carefully managed in urbanizing areas to ensure that the health of our creek is protected. Interconnected forests, wetlands and streams are needed to maintain water quality as well as the variety of life on our unique landscape and to ensure our vision of "Escarpment to Bay" becomes a reality.

Community stewardship will continue to be an important tool to restore watershed health. Through natural heritage system protection, innovative planning and wise stewardship, we can sustainably manage the Silver Creek watershed for the benefit of present and future generations.



Courtesy of Conservation Ontario

BLUE MOUNTAIN WATERSHED TRUST

THANK YOU!

Thanks to all of our Watershed Champions – landowners, community groups, schools, businesses, municipalities and other government agencies – who support stewardship activities in our watershed!

For more information or to get involved, contact the BMWT at (705) 445-0357 or find us online at www.watershedtrust.ca

Ontario Trillium Foundation
Fondation Trillium de l'Ontario
An agency of the Government of Ontario
Un organisme du gouvernement de l'Ontario

Agencies and Organizations in the Silver Creek Watershed:
Grey County, Simcoe County, Town of Blue Mountains, Town of Collingwood, Nottawasaga Valley Conservation Authority, Blue Mountain Watershed Trust, Nature League, Environment Network

"We need the natural world: help us protect it"