

Nottawasaga Valley Conservation Authority



Middle Nottawasaga River

2013 Subwatershed Health Check

2013 Health Check Results:

Forest Conditions: Fair

Wetland Conditions: Good

Stream Health: Fair

Groundwater Health: Very Good

This Health Check describes the health of forests, wetlands, streams and groundwater within the Middle Nottawasaga River subwatershed.

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.



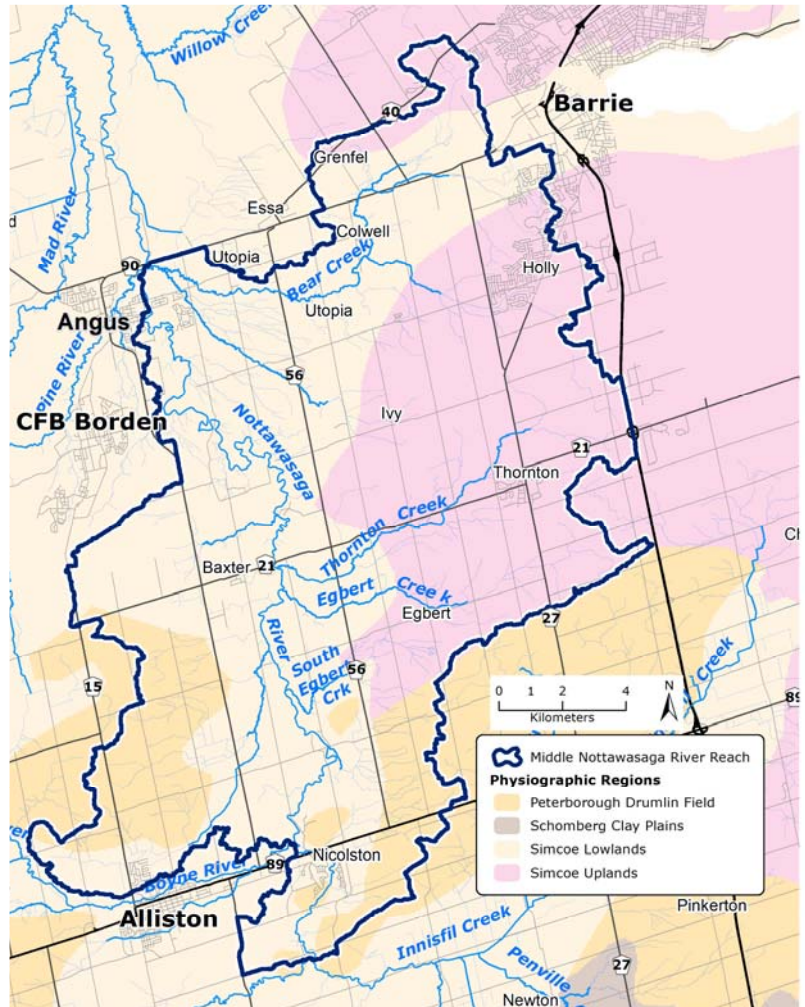
The Middle Nottawasaga River extends from the river confluence with Innisfil Creek (southeast of Alliston) downstream to Angus. Downstream of the Nicolston dam, the river flows through a steep, narrow, well-forested valley that cuts through the sand plains of the Simcoe Lowlands. The Boyne River, Pine River and Innisfil Creek enter the Nottawasaga River through this section.

Lands next to the valley are typically well-drained and support extensive potato and sod farms. Lands further away from the deep valley are generally imperfectly drained and support large tracts of lowland and swamp forest.

Bear Creek emerges along the steep slopes of the Algonquin Bluffs south of Ardagh Road in Barrie. The rollicking springs combine and slow as they enter a series of wetlands, which extend into Essa Township. The creek flows downstream through the Tiffin Centre for Conservation and over the dam at the Utopia Conservation Area before discharging to the Nottawasaga River at County Road 90 in Angus.



Thornton Creek and Egbert Creek originate near Thornton, flowing through deep, narrow, forested valleys before entering more extensive forest and swamp cover and then downstream to the Nottawasaga River. South Egbert Creek is a smaller system, arising just south of Egbert. It flows through agricultural lands before entering a forested valley as it nears the river.



The Nottawasaga Valley Conservation Authority is a public agency dedicated to the preservation of a healthy environment through specialized programs to protect, conserve and enhance our water, wetlands, forests and lands. This Health Check describes the conditions of natural features within the subwatershed, as well as stewardship actions to help maintain the area. Health Checks for the NVCA watershed and subwatersheds can be found online: www.nvca.on.ca

Watershed indicators rating scale:

very good

good

fair

poor

very poor

Forest Conditions

Status: Fair
Trend: Declining

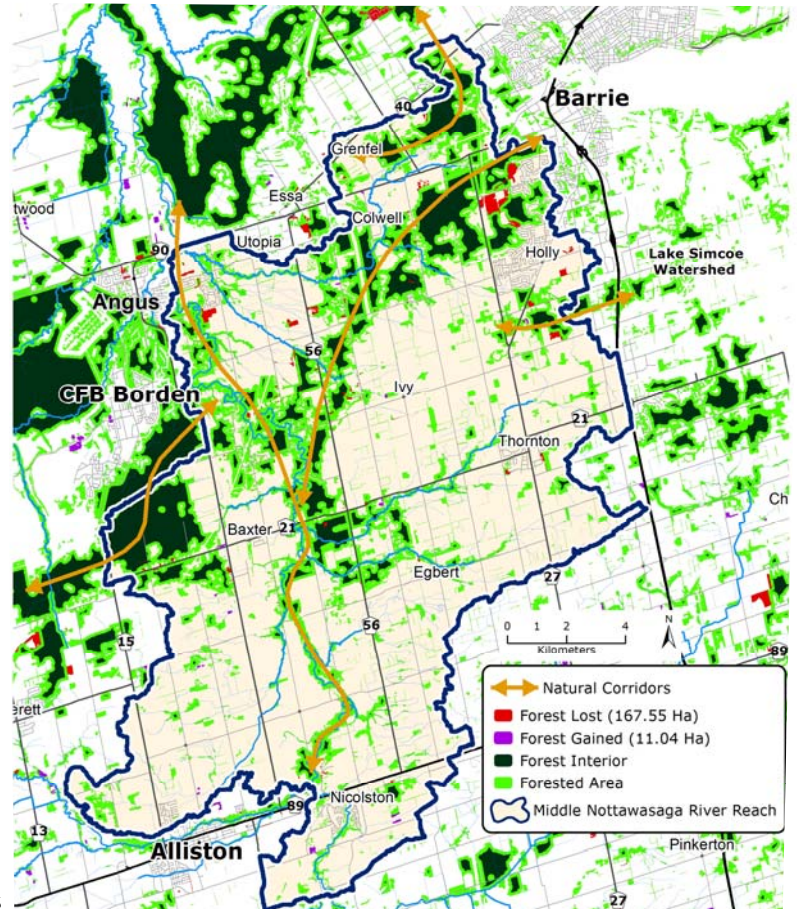
Forest cover in the Middle Nottawasaga River subwatershed is moderately healthy but variable. Large forests provide significant habitat for wildlife species that require deep, undisturbed forest habitat (forest interior) to thrive.

Sparse forest cover is found on the extensive agricultural lands of the Simcoe Uplands and well-drained portions of the Simcoe Lowlands. Larger forests are found along the Algonquin Bluffs and adjacent bottomlands, forming an arc of forest cover extending from Barrie through Colwell to just east of Baxter. A large swamp forest extends into the southeast corner of CFB Borden. Long but relatively narrow forests extend along the valley systems of the Nottawasaga River, Bear Creek, Thornton Creek and Egbert Creek.

The Algonquin Bluffs provide diverse forest habitats ranging from dry oak stands along exposed sand/gravel ridges to dense coniferous/mixed swamps along the base of the bluffs. The interconnected habitats within this large core area support a wide range of native plants and animals. Rare prairie-savannah habitats are associated with open oak woodlands and glades.

Forests of the Middle Nottawasaga River subwatershed provide important natural connections to the Minesing Wetlands and to the Willow Creek subwatershed. Headwater forests south of Holly are connected to the Lovers Creek subwatershed (Lake Simcoe watershed). The Algonquin Bluffs and Nottawasaga River forests are linked to a significant provincial-scale natural corridor that extends northeast from the Niagara Escarpment to the Canadian Shield.

Based on satellite photo interpretation, between 2002 and 2008 there was a net loss in subwatershed forest cover of 157 ha. This represents a 1.9% decrease in forest cover since 2002. Forest loss was generally associated with development activity.



Indicators	Middle Nottawasaga River Subwatershed	NVCA Watershed	Indicator Description	Trend (2002-2008)
Forest Cover	27.6% (8,188 ha)	32.6%	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.	↓ -157 ha
Forest Interior	8.1% (2,414 ha)	10.3%	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.	Insufficient data
Riparian Cover	55.9% (1,542 ha)	64.9%	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.	Insufficient data

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 subwatershed. 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 wetland swamps, marshes and fens in the Middle Nottawasaga River subwatershed provide habitat for a rich variety of flora and fauna.

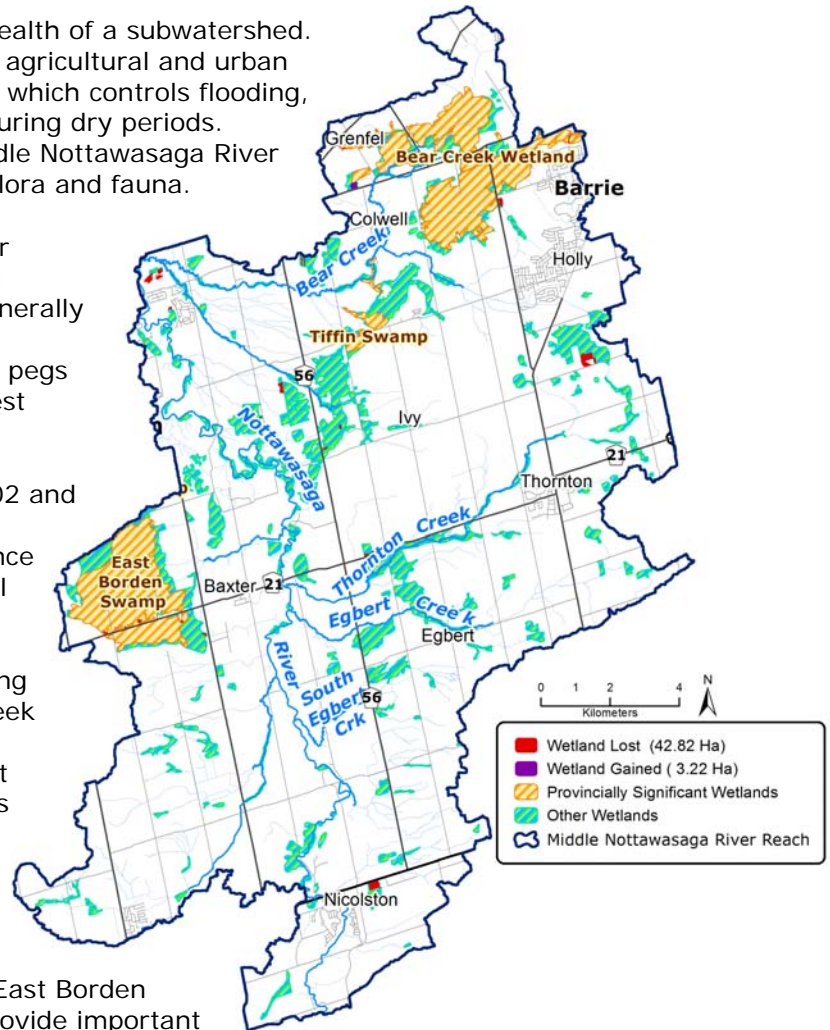
Wetland conditions in the Middle Nottawasaga River subwatershed meet Environment Canada minimum guidelines for wetland cover and are considered generally healthy; however, historical wetland loss has been significant. A recent Ducks Unlimited Canada study pegs historical wetland loss in Essa Township – the largest municipality within the subwatershed – at 43.9%.

Based on satellite photo interpretation, between 2002 and 2008 there was a net wetland loss of 40 ha. This represents a 1% decrease in wetland cover since 2002. Wetland loss was associated with agricultural conversion and development.

Wetlands and lowland forests extend in an arc (along the base of the Algonquin Bluffs) from the Bear Creek Wetland through Tiffin Swamp to Baxter Swamp. The East Borden Swamp extends into the southeast corner of CFB Borden. A smaller wetland complex is associated with the mid-reaches of Thornton and Egbert Creeks. Throughout the agricultural portions of the subwatershed wetlands tend to be small and relatively isolated.

Mixed and coniferous swamps associated with the East Borden Swamp, Bear Creek Wetland and Baxter Swamp provide important winter habitat for deer. A regionally rare fen – an open wetland dominated by sedges and grasses – is found in the headwaters of Thornton Creek.

Three wetland groupings – Bear Creek Wetland Complex, Tiffin Swamp Complex and East Borden Swamp Complex - have been identified as provincially significant by the Ontario Ministry of Natural Resources. Provincial and municipal planning policies help protect these wetlands from development and site alteration. A large, unevaluated wetland complex is present within and next to the City of Barrie annexation lands. Several wetlands along the base of the Algonquin shoreline bluff could be added to the evaluated Tiffin Swamp complex.



Indicators	Middle Nottawasaga River Subwatershed	NVCA Watershed	Indicator Description	Trend (2002-2008)
Wetland Cover	12.6% (3,729 ha)	12.3%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	-40 ha
Wetland Buffer (100m buffer area)	50.7% (1,858 ha)	51.5%	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.	Insufficient data

Stream Health

Status: Fair
Trend: No Trend

Surface water quality and stream habitat in the Middle Nottawasaga River subwatershed ranges from “unimpaired” to “impaired”. The main river supports pike and bass and provides a migratory corridor for Rainbow Trout and Chinook Salmon, which pass upstream over the dam at Nicolston on their way to prime spawning grounds. Lake Sturgeon – a threatened species – spawn in the riffles downstream of Nicolston. Bear Creek, Thornton Creek and Egbert Creek provide productive trout habitat.

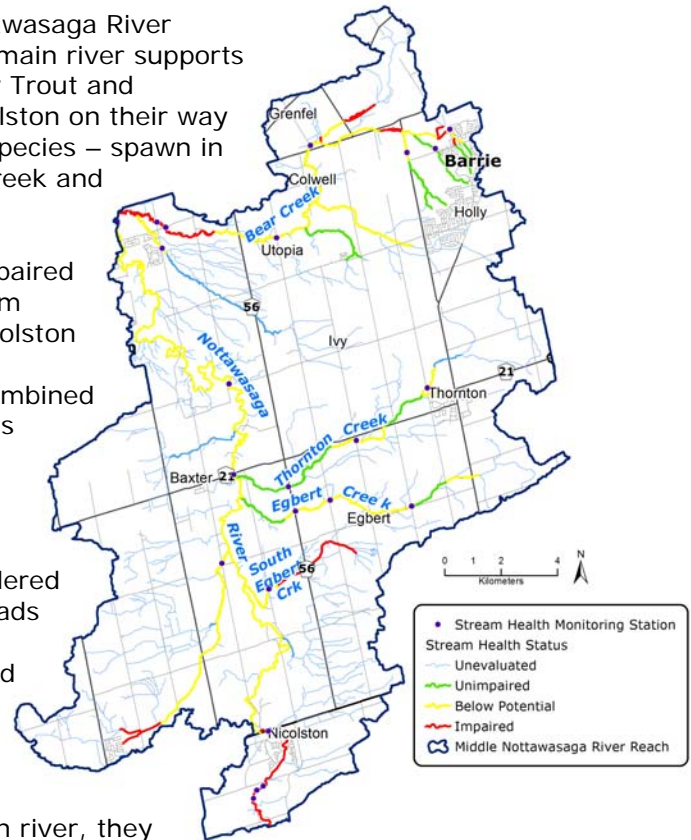
The upstream portion of the Middle Nottawasaga River is impaired – impacted by significant nutrient and sediment loadings from Innisfil Creek. The large backwater area upstream of the Nicolston dam also contributes to impaired conditions. Downstream of Nicolston, cleaner inflows from the Boyne and Pine Rivers combined with natural river filtering result in river health improvements and a “below potential” health rating.

The spring-fed headwaters of Bear Creek are generally healthy, but some sections are impacted from recent urban development. Downstream of Barrie, stream health is considered below potential to impaired, with impacts associated with roads and agricultural land use. The Utopia Conservation Area reservoir impacts Bear Creek and stream health is considered impaired downstream to the Nottawasaga River.

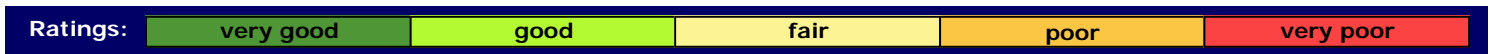
Other Middle Nottawasaga tributaries originate in agricultural landscapes and exhibit below potential to impaired stream health. As the tributaries approach the main river, they cut into deep valley systems and their health improves as they enter these forested areas and pick up groundwater flow (springs).

Nutrient concentrations (total phosphorus) are elevated on the main river largely due to inputs from Innisfil Creek but are generally below the provincial objective. Bacteria (*E. coli*) levels in the main river and downstream portions of Bear Creek fluctuate throughout the summer months – swimming outside of regularly monitored beaches should be undertaken at your own risk.

Overall, stream health has remained unchanged since the 2007 report card. Refinements to mapping reflect additional information available from expanded monitoring coverage.



Indicators	Middle Nottawasaga River Subwatershed	Indicator Description	Trend (2007-2012)
Benthic Grade	1.91	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)	0.022	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 (Middle Nottawasaga River range: 0.007—0.380 mg/L). Provincial Water Quality Guidelines suggest that levels greater than 0.03 mg/L result in unhealthy stream conditions.	↔
<i>E. coli</i> (low flow; coliform-forming units/100mL)	49	<i>Escherichia coli</i> 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. <i>E. coli</i> is not closely tied to stream health. <i>This data is presented for general public information only.</i>	Insufficient Data



Groundwater

Status: Very Good
Trend: Insufficient data

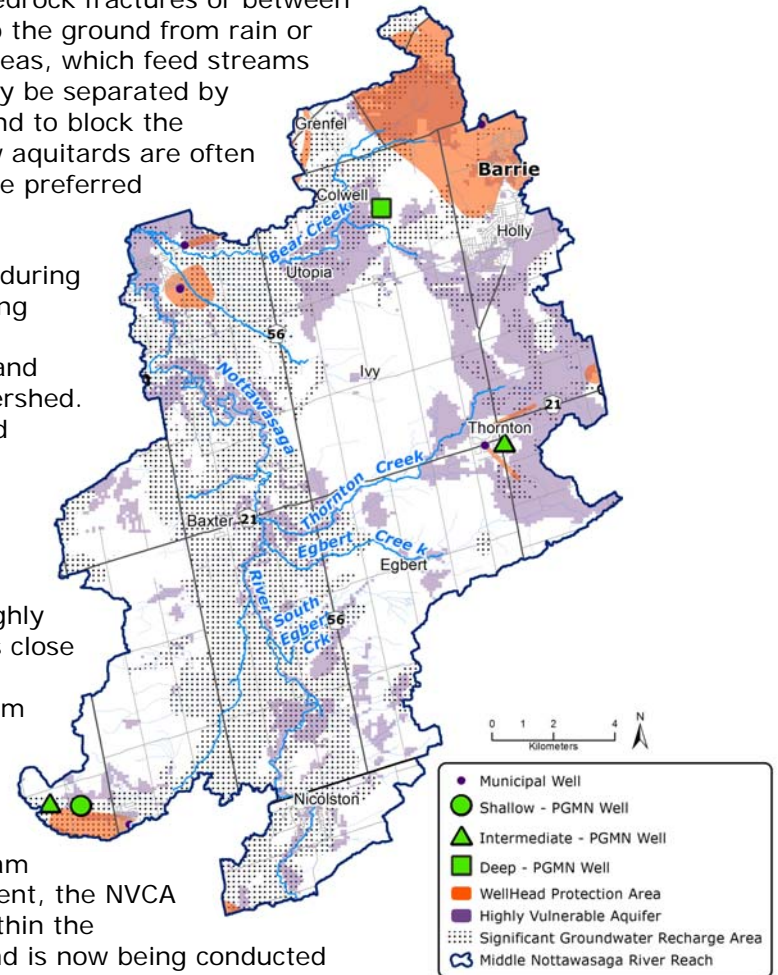
Groundwater is water that is stored underground in bedrock fractures or between sand/gravel grains in aquifers. Groundwater sinks into the ground from rain or snowmelt then moves to spring and seep discharge areas, which feed streams and wetlands, or downward into aquifers. Aquifers may be separated 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 NVCA watershed. These wells provide drinking water for most watershed residents.

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 16 wells within the watershed. Groundwater monitoring began in 2003 and is now being conducted annually. Monitoring data allows the NVCA to track changes in groundwater quantity and quality over time.

Results to date indicate that water quality parameters in all monitoring wells meet Ontario Drinking Water Quality Standards. Groundwater health in the Middle Nottawasaga River subwatershed is considered very good. Additional data is required to interpret broad groundwater quality trends in the subwatershed.



Indicators	Middle Nottawasaga River Subwatershed Monitoring Well Results*			Indicator Description
	Shallow (1 well)	Intermediate (2 wells)	Deep (1 well)	
Chloride (mg/L)	3.7	15.75	4.13	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)	1.23	0.22	0.05	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.** Trends 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 **96% of land in our watersheds is privately owned**. We all depend on good private land stewardship to achieve healthy waters and sustainable ecosystems. To help landowners protect the environment, the NVCA provides a range of technical assistance and grant incentives to help offset the cost of projects on private lands. Grant rates for the various NVCA programs range from 25% to 95% of eligible project costs.

STEWARDSHIP PROGRAMS

The NVCA's stewardship programs encourage landowners to undertake projects that restore our environment and help ensure the future of our healthy waters.

The NVCA's **Forestry Program** provides trees, planting services and forest management advice for landowners throughout the watershed. Since 2002, landowners in the Middle Nottawasaga River subwatershed have helped plant **142,510 trees**, reforesting **60 ha**. More than **25 landowners** have been involved.

The NVCA's **Healthy Waters Program** provides landowners with technical and financial support for eligible projects, such as water improvement projects and strategic river habitat restoration. Since 2002, landowners in the Middle Nottawasaga River subwatershed have undertaken **64 stewardship projects** on their properties through the support of this program. These projects have stabilized stream banks, improved fish and wildlife habitat, and decreased nutrient runoff – and have kept literally trillions of *E. coli* bacteria from reaching our streams and lakes.

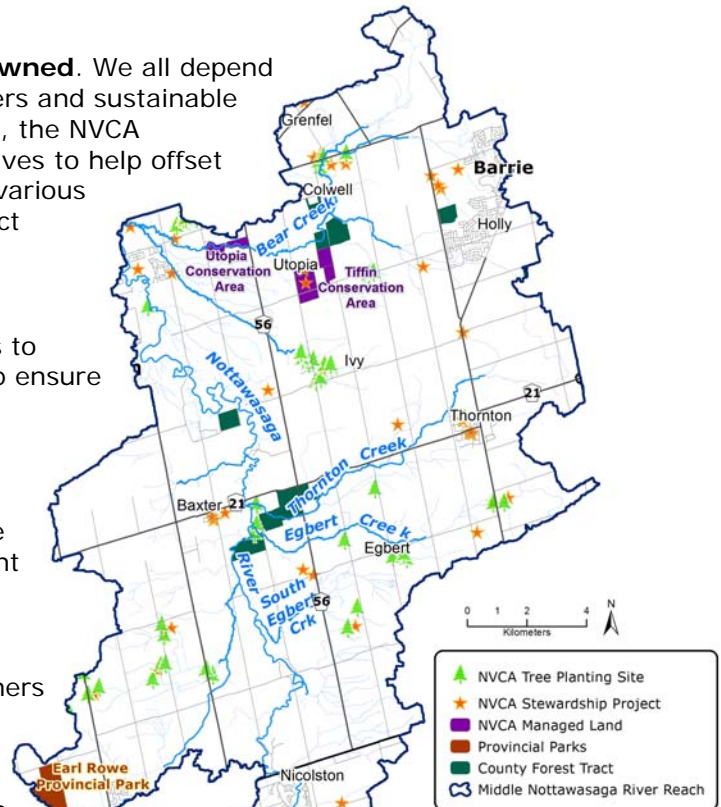
PUBLIC LANDS MANAGEMENT

The NVCA's **Conservation Lands Program** focuses on acquiring lands for the long-term protection of significant natural features and functions. To date, within the Middle Nottawasaga River subwatershed the NVCA manages three properties totaling 168 ha.

County Forests are managed for a variety of environmental, social and economic purposes. Six Simcoe County Forest tracts, totaling 385 ha, lie within the Middle Nottawasaga River subwatershed.

Ontario Parks' mandate is "to protect significant natural and cultural resources in a system of parks and protected areas that is sustainable and provides opportunities for inspiration, enjoyment and education: now and for future generations." Ontario Parks manages one park area (119 ha) within this subwatershed.

Many **local municipalities** also acquire and manage lands in the public trust.



Congratulations to our Watershed Stewards in the Middle Nottawasaga River Subwatershed!

A dedicated group of students from Bear Creek Secondary School have been rolling up their sleeves with great enthusiasm to help build a new trail system at the Tiffin Centre for Conservation. These trails incorporate new interpretive signage and a boardwalk that makes the area around the Tiffin Centre more accessible for nature enthusiasts while reducing their impact on the environment. Their conservation efforts deserve recognition.

This is only one of the many community champions that are helping to improve subwatershed health!



Forest and wetland conditions in the Middle Nottawasaga River subwatershed are moderately healthy but stream health is only fair. Key subwatershed stewardship objectives are focused on improving stream health. Enhancing habitat conditions for Lake Sturgeon, a threatened species that spawns in the Nottawasaga River, is a high priority. Actions to enhance habitat will improve water quality and contribute to improved subwatershed forest conditions.

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 stream 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
- Minimize pesticide use wherever possible

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
- Step into nature – check out our interactive conservation area guide at nvca.on.ca
- Join a local 'Friends of' or 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

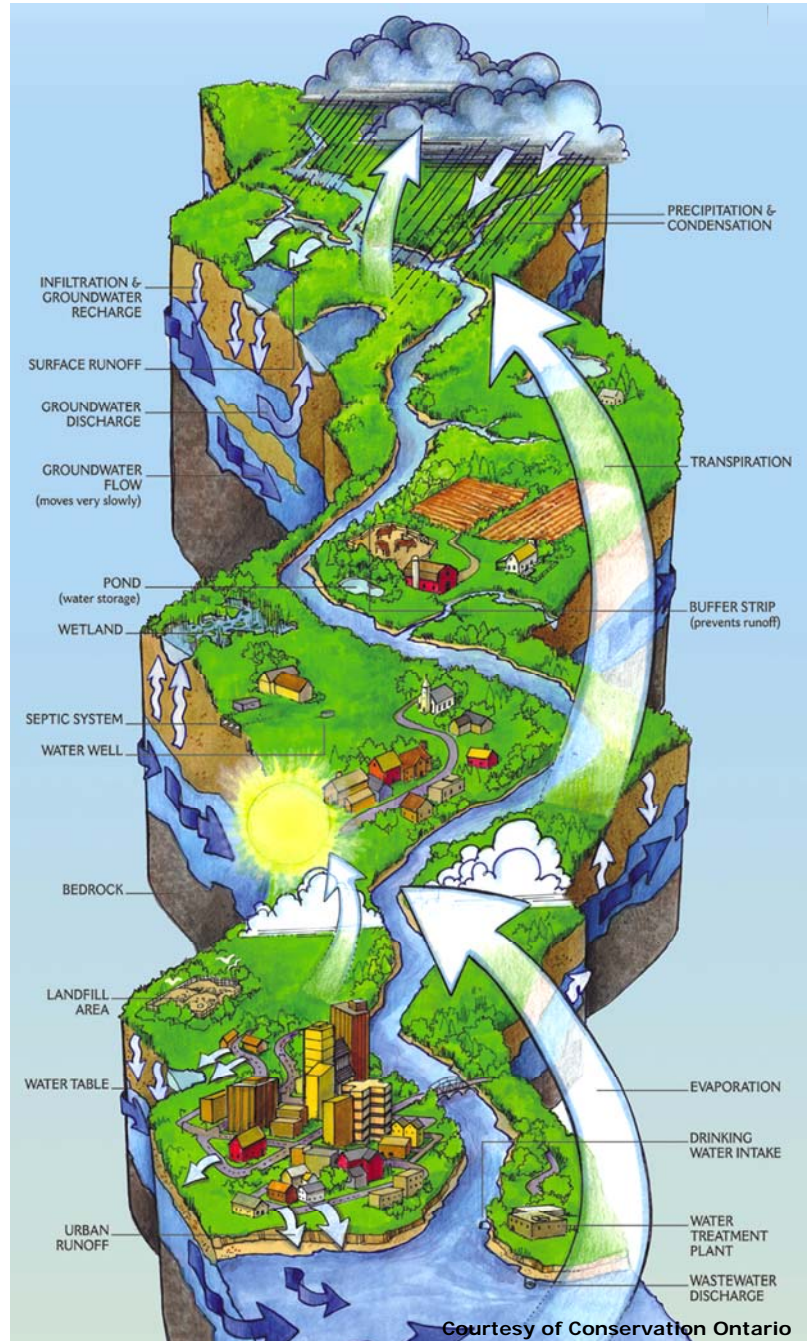
A healthy natural heritage and water resource system is the foundation of a high quality sustainable community. Often these services are overlooked and undervalued. The ecosystem services provided by our lands and waters include:

- 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 our watershed communities. 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 community. Water resources, including stormwater and wastewater, must be carefully managed in urbanizing areas to ensure that the health of our rivers, stream and lakes is protected. Development must be planned to ensure it is safe from flooding and erosion hazards. Interconnected forests, wetlands and streams are needed to maintain water quality as well as the variety of life on our landscape.

Community stewardship will continue to be an important tool to restore subwatershed health. Through innovative planning and wise stewardship, we can sustainably manage our local streams, lakes and natural areas for the benefit of present and future generations.



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 NVCA at (705)424-1479 or www.nvca.on.ca

A member of:



Partner Municipalities in the Middle Nottawasaga River Subwatershed:

CFB Borden, Township of Adjala-Tosorontio, Town of Bradford-West Gwillimbury, Town of Caledon, Township of Essa, Town of Innisfil, Town of Mono, Town of New Tecumseth

"Working Together to Protect and Restore"

