

Upper Nottawasaga River **SUBWATERSHED** Health Check 2018



Nottawasaga Valley
Conservation Authority

The Nottawasaga Valley Conservation Authority is your public agency dedicated to the preservation of a healthy environment. As your partner, the NVCA provides the expertise to help protect our water, our land, our future.



WHAT IS A SUBWATERSHED HEALTH CHECK?

NVCA's subwatershed health checks provide an overview of forest, wetlands, stream and groundwater health within the larger NVCA watershed. They also identify stewardship priorities, future challenges and opportunities to improve environmental health.

Watershed health checks were completed for all nine of NVCA's subwatersheds in 2018, and are produced every five years. Our science monitoring staff collects samples from forests, wetlands, streams and groundwater for data analysis. Our stewardship staff uses this information to determine the success of past restoration projects and areas in need of improvement.

NVCA began producing Subwatershed Report Cards in 2007. In 2013, they were renamed to Watershed Health Checks in an effort to differentiate these reports from Conservation Ontario's province-wide Watershed Report Cards.

What is a subwatershed?

A subwatershed is a smaller watershed within a larger basin. The water from the subwatershed contributes to a stream connected to the main river. In the Nottawasaga Valley Watershed, this river is the Nottawasaga River. Everything in a subwatershed is connected, meaning our actions upstream can affect conditions downstream.

Nottawasaga Valley Watershed's nine subwatersheds

- Blue Mountains Subwatershed
 - Lower Nottawasaga Subwatershed
 - Willow Creek Subwatershed
 - Mad River Subwatershed
 - Pine River Subwatershed
- Middle Nottawasaga River Subwatershed
 - Boyne River Subwatershed
 - Upper Nottawasaga Subwatershed
 - Innisfil Creek Subwatershed



WHAT WE MEASURED

We measured the status and health of the forests, wetlands, streams and groundwater in each subwatershed. We also reported the number of stewardship projects that were completed from 2002 to 2016.



Why Measure?

Measuring helps us better understand our watershed. With this information, we can better target where planning and restoration is needed and track progress of watershed conditions.

OUR GRADING SYSTEM

VERY GOOD	An environment that is at or close to natural conditions
GOOD	An environment close to natural conditions with minor disturbance
FAIR	A disturbed environment
POOR	A highly disturbed environment
VERY POOR	An environment that lacks natural features
NO DATA	Not enough data to make a conclusion

WHERE ARE WE?



ABOUT THE UPPER NOTTAWASAGA RIVER SUBWATERSHED

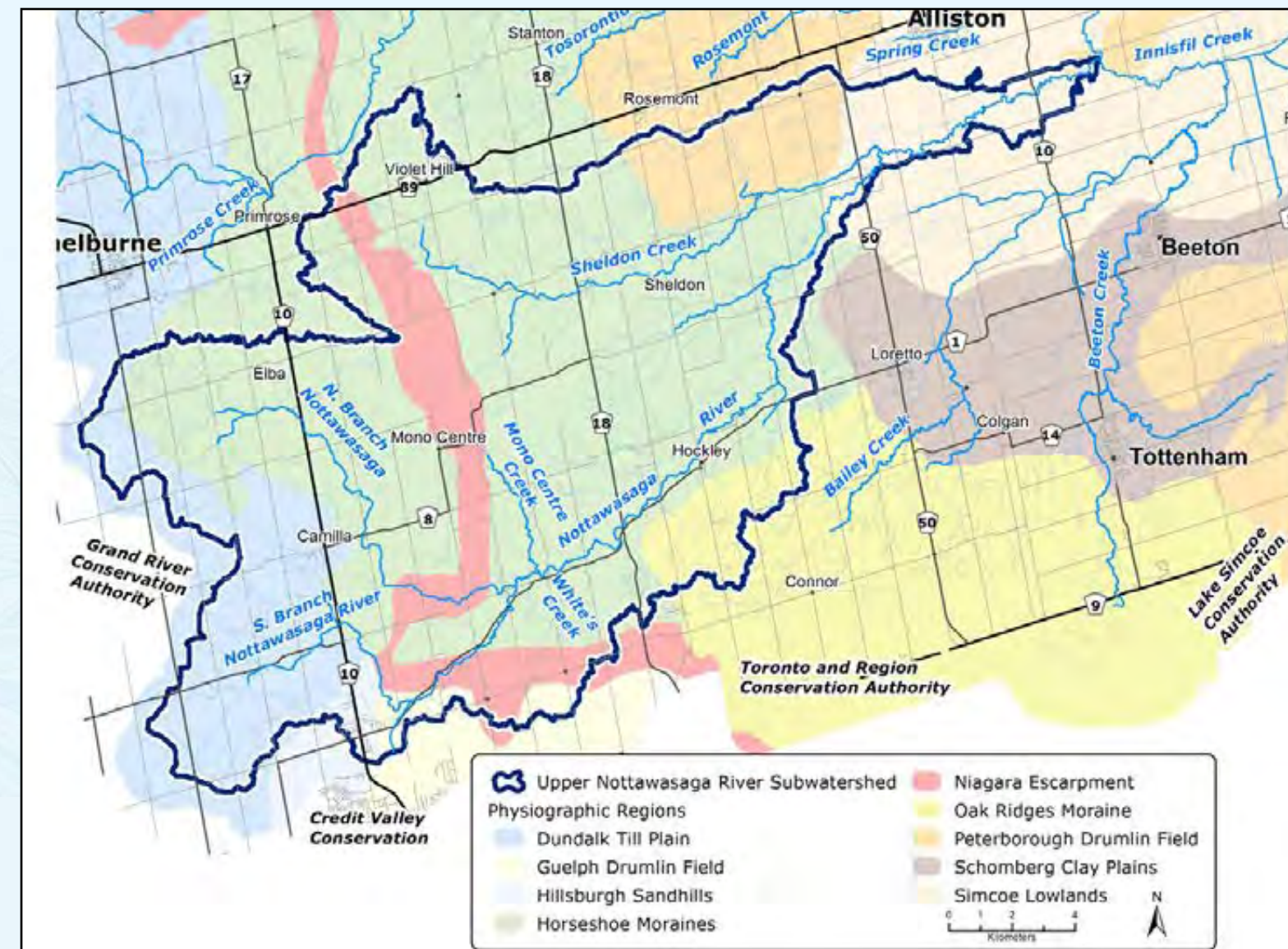
The Nottawasaga River arises as two stream branches (North Branch and South Branch) within a series of wetlands west of the Niagara Escarpment near the hamlets of Elba and Camilla. Both branches flow eastward through a gently rolling rural/agricultural landscape before entering the extensive forests and steep slopes associated with the Escarpment (World Biosphere Reserve).

The North Branch and South Branch converge near the hamlet of Glen Cross. The Nottawasaga River continues to flow eastward through rugged, forested Escarpment and moraine topography before entering a predominantly agricultural landscape north of Loretto. From Loretto downstream to the Nottawasaga River's confluence

with Innisfil Creek, the river flows through a valley cut into a large expanse of agricultural sand plains.

Sheldon Creek is a major stream entering the Nottawasaga River in this area. It arises along the steep, forested slopes of the Escarpment near the hamlet of Violet Hill and flows eastward through a well-forested valley system through the hamlet of Sheldon. Sheldon Creek then enters an agricultural landscape that extends to the main river east of County Road 50.

A number of smaller streams enter the Nottawasaga River along the Escarpment. Some, like White's Creek, flow relatively unobstructed to the river through steep, forested ravines. Others, such as Mono Centre Creek, are obstructed by dams and ponds as they make their way to the main river.





FOREST CONDITIONS

Status: Good
Trend: Insufficient Data

The Upper Nottawasaga River subwatershed supports significant forest cover. Forests are often narrow and fragmented and do not provide much habitat for wildlife species that require forest interior habitat (deep, undisturbed forests) to thrive.

Forest cover is concentrated along the moraine-mantled slopes of the Niagara Escarpment, which extends westward into the Elba wetlands along the North Branch of the Nottawasaga River. The till and sand plains east and west of the Escarpment are ideal for agriculture and therefore support less forest cover.

The provincially significant Beattie Pinery (south of Alliston) is one of the last remnants of the great pine forest that once covered well-drained portions of the Simcoe Lowlands. The provincially and regionally significant forests along the Niagara Escarpment support rare wildlife such as Louisiana Waterthrush and the endangered Jefferson Salamander. Salamanders, though seldom seen, play an important role in forest ecology and forest food chains. Mixed and coniferous forests cover

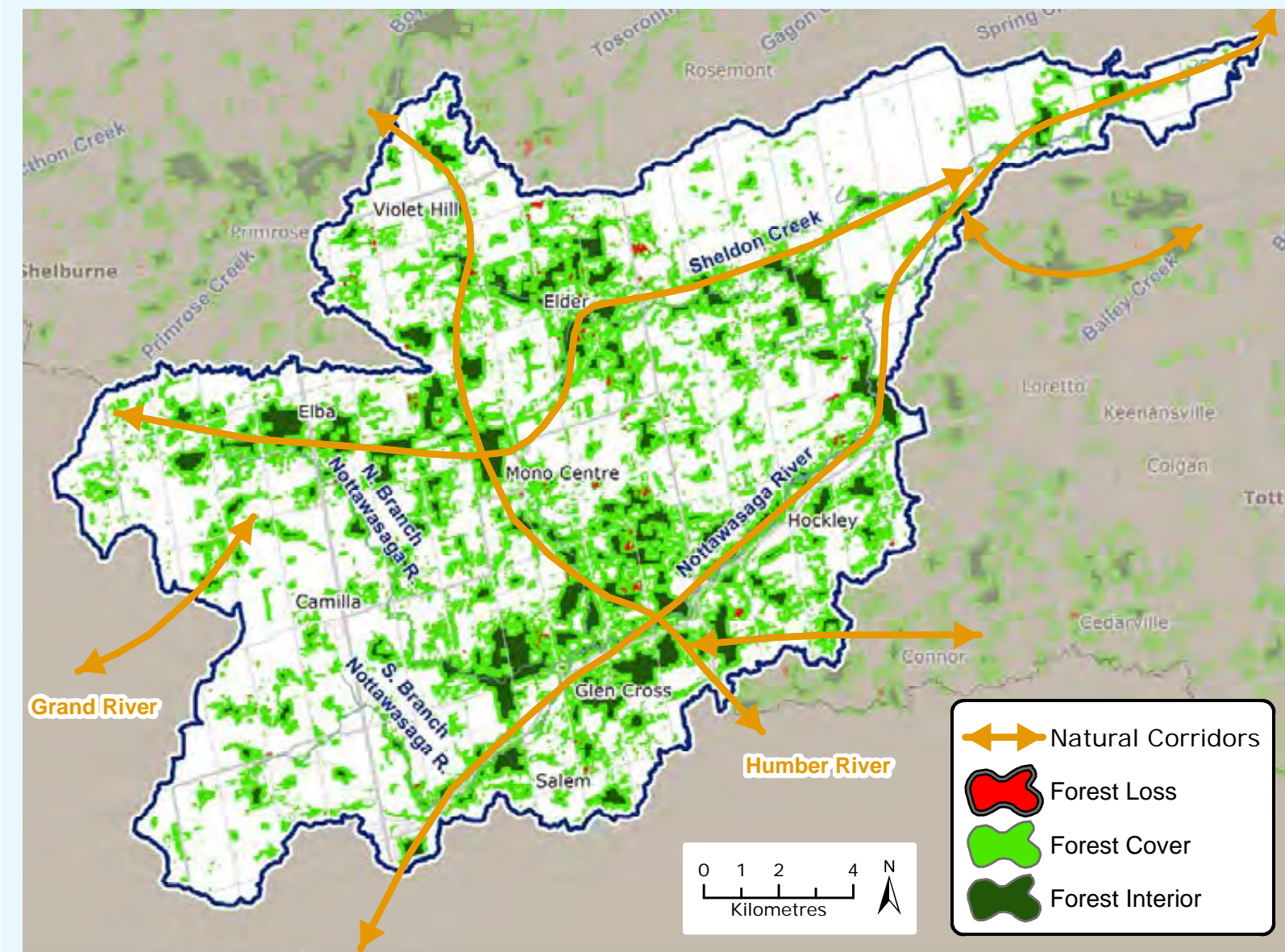
along the Nottawasaga River valley provide shelter and food for deer during the harsh winter months.

As shown with orange arrows in the map, forests in the Upper Nottawasaga River subwatershed are part of the natural corridors along the Niagara Escarpment, connecting with other Escarpment forests in the Boyne River subwatershed and Credit Valley watershed. These forests also provide an important link between the Niagara Escarpment and the Oak Ridges Moraine (Bailey Creek and Humber River) to the southeast. Headwater (river source areas) wetland forests west of the Escarpment connect to similar wetlands in the Grand River watershed. A narrow, fragmented valley corridor extends northeast to the Middle Nottawasaga River subwatershed.

Due to the lack of updated forest cover mapping, Global Forest Change analysis was used showing that there was a loss in subwatershed forest cover of 63 hectares (ha). This method of analysis did not explain the cause of the forest loss or allow for the determination of the amount of forest gain.

Indicators	Upper Nottawasaga River Subwatershed	NVCA Watershed	Indicator Description
Forest Cover	36.7% (12,400 ha)	33.39%	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.
Forest Interior	7.1% (2,411 ha)	9.11%	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.
Riparian Cover	56.1% (1,760 ha)	52%	Streamside vegetation (riparian cover) 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. Only forest cover was available for riparian cover assessment in this Watershed Health Check.

Rating Scale:





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 control flooding, reduce erosion and help maintain stream flows during dry periods by holding back water on the landscape.

The wetland swamps and marshes in the Upper Nottawasaga subwatershed provide habitat for a rich variety of plants and animals. Many animals that live in wetlands also depend on nearby upland habitats for nesting, foraging and hibernation.

Wetland conditions in the Upper Nottawasaga River subwatershed are generally healthy and meet Environment Canada's wetland habitat guidelines. However, historical wetland loss has been significant. Data from Ducks Unlimited Canada indicates historical wetland loss in the Town of Mono (the largest municipality within the subwatershed) is 54.2%.

In the Upper Nottawasaga subwatershed, based on satellite photo interpretation, between 2009

and 2016 there was a net subwatershed wetland loss of 23.0 hectares (ha). This represents a 0.5% decrease in wetland cover since 2008. Agricultural conversion and urban development activity resulted in most of the wetland loss.

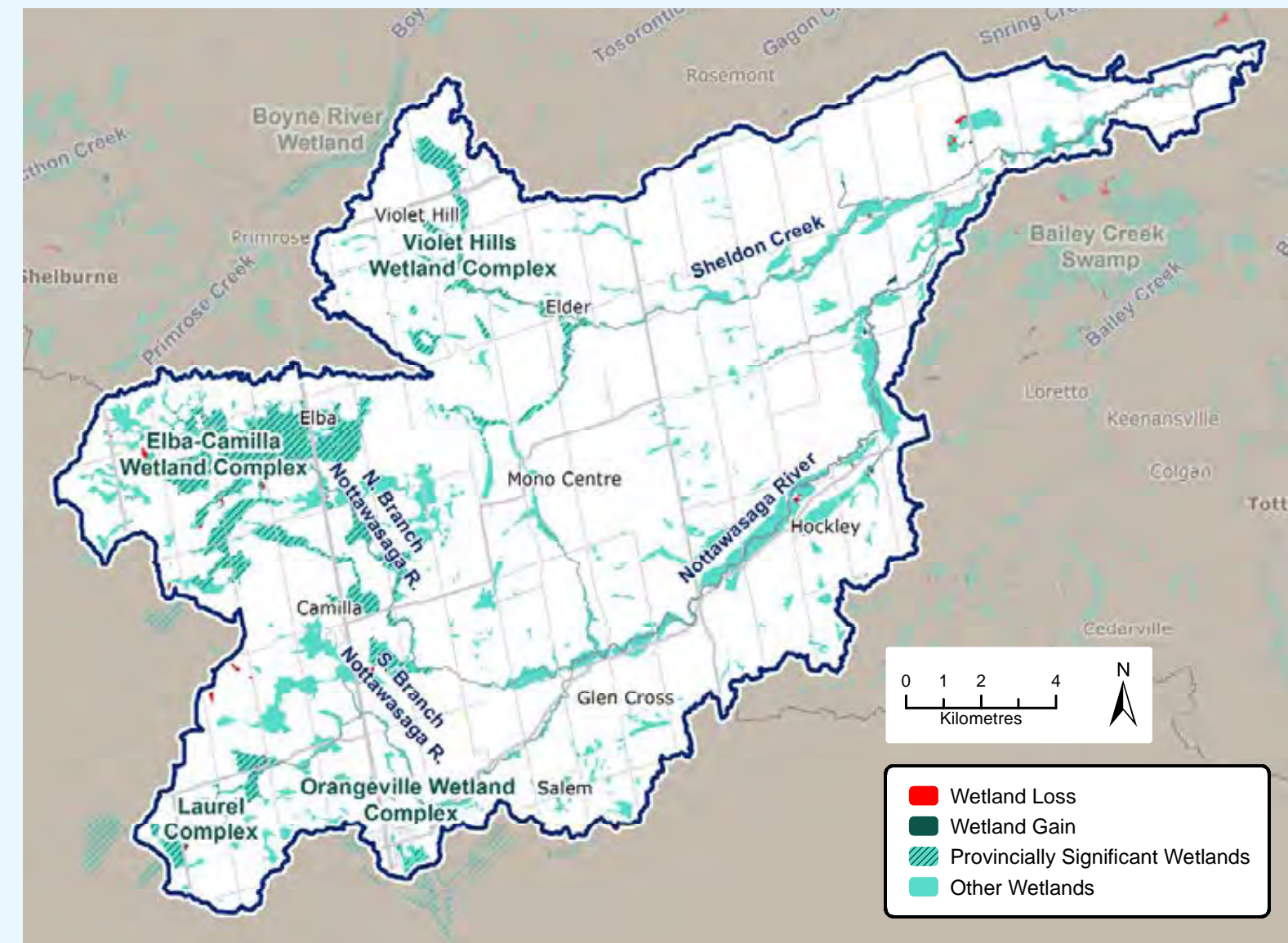
Large headwater wetlands to the west of the Niagara Escarpment are source areas for the north and south branches of the Nottawasaga River as well as Sheldon Creek. A series of wetlands follows the Nottawasaga Valley through the Escarpment and Simcoe Lowlands.

Four groups of wetlands in the Upper Nottawasaga subwatershed have been identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry: Orangeville Wetland Complex, Laurel Wetland Complex, Elba-Camilla Wetland Complex and Violet Hills Wetland Complex. Provincial and municipal planning policies help protect these wetlands from development and site alteration. A number of unevaluated wetlands in the subwatershed could be added to existing evaluated wetland groupings.



Indicators	Upper Nottawasaga River Subwatershed	NVCA Watershed	Indicator Description	Trend (2009-2016)
Wetland Cover	13.0% (4,395 ha)	14.2%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	Down -23.0 ha
Wetland Buffer (100m buffer area)	38.6% (2,522 ha)	39.2%	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. Only forest cover was available for buffer assessment through the 2018 Watershed Health Check.	Insufficient data

Rating Scale:





STREAM HEALTH

Status: Very Good
Trend: No Change

Stream health is determined by testing water chemistry and evaluating the health of benthic macroinvertebrates (water bugs). They are categorized as Unimpaired (very healthy), Below Potential (moderate health) and Impaired (very poor health). Final grades, like in the table below, are arrived at by merging these two factors.

Stream health in the Upper Nottawasaga River subwatershed is generally Unimpaired. The Nottawasaga River and its tributaries in this area support healthy resident and migratory trout populations.

Stream health in the South Branch of the Nottawasaga River is graded as Below Potential through rural/agricultural areas west of the Niagara Escarpment. Though not assessed in this Watershed Health Check, the North Branch of the Nottawasaga River was historically also graded as Below Potential in stream health through this area. As the two Branches enter the Escarpment zone, stream health rapidly improves. Extensive forest cover and groundwater discharge (springs) through the Escarpment contribute to this improved stream

health. Tributaries with Below Potential stream health in the Escarpment are associated with online ponds and poor land use practices along the stream banks.

East of the Escarpment, stream health declines to Below Potential as the Nottawasaga River enters an agricultural landscape with relatively sparse forest and natural vegetation cover in the Simcoe Lowlands.

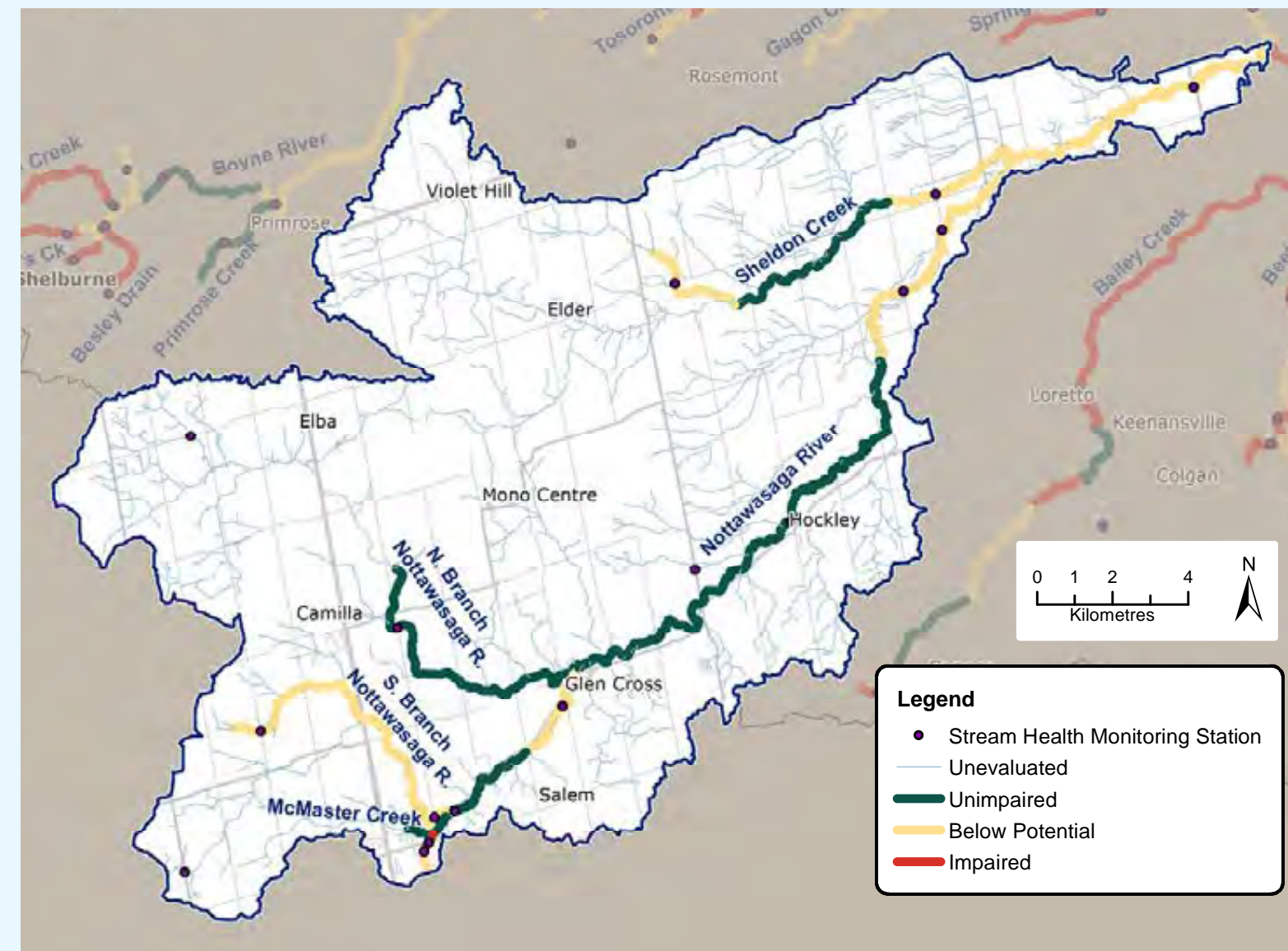
Sheldon Creek is a healthy Unimpaired stream for most of its length. Its bottom end is affected by degraded riparian (streambank) vegetation leading to a Below Potential grade west of County Road 50.

Low nutrient concentrations (total phosphorus) at the Hockley water quality sampling station confirm the grading of the river.

Overall, stream health has remained unchanged since the 2013 Health Check. The 2018 Watershed Health Check assessed only 15% of the river length in the Upper Nottawasaga River subwatershed, down from 26% in 2013.

Indicators	Upper Nottawasaga River Subwatershed	Indicator Description	Indicator Trend (2012-2016)
Benthic Grade	2.48	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"	No Change
Total Phosphorus (low flow; mg/L)	0.009	Total phosphorus indicates nutrient levels within a stream. Our healthiest streams have levels less than 0.01 mg/L during low flow conditions. Upper Nottawasaga River range: 0.003—0.275 mg/L. Provincial Water Quality Guidelines suggest that levels greater than 0.03 mg/L result in unhealthy stream conditions.	No Change

Rating Scale:





GROUNDWATER QUALITY

Status:
Chloride: Very Good
Nitrate + Nitrite: Very Poor

Groundwater is water that is stored underground in soils and bedrock fractures. When it rains or when snow melts, water absorbs into the ground, eventually feeding local streams and wetlands or filter down into aquifers. Aquifers may be separated into different layers. Sediments that are relatively impermeable, such as clay and silt, offer protection by limiting the amount of water to flow into the aquifer. This layer is called an aquitard. Aquifers located below aquitards are preferred drinking water sources.

It is important to keep contaminants out of groundwater because it supports a variety of uses including municipal and private water supplies, agricultural irrigation, and is a source for rivers and streams. Contaminants can come from both urban and rural areas. Chloride and nitrate are used here as indicators for groundwater quality. In urban areas, groundwater is susceptible to chloride due to excessive application of winter salt on roads and parking lots. In rural areas, nitrate in groundwater can be due to excessive and improper use of crop fertilizers.

Staff from the NVCA and the Province of Ontario have been working with municipalities, communities, and

individual residents to reduce the potential for groundwater contamination. For opportunities to reduce these contaminants, please refer to the Watershed Stewardship section.

In the Upper Nottawasaga River subwatershed, there are five municipal wells providing drinking water to residents. Through the Provincial Groundwater Monitoring Network (PGMN) partnership with the Ministry of the Environment, Conservation, and Parks, the NVCA monitors water levels and water quality at one PGMN well in this subwatershed. Groundwater monitoring began in 2009 and sampling has been conducted annually since then, allowing the NVCA to track changes in groundwater levels and quality over time.

Results to date indicate that the PGMN monitoring well meets Ontario Drinking Water Quality Standards for chloride; however, it exceeds the limit for nitrate+nitrite. The NVCA requires additional data to interpret trends in groundwater quality at the sampled wells. Since some wells are deeper than others and water chemistry differs between aquifers, individual samples do not necessarily reflect the broader groundwater quality in areas removed from a sampled well.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description
Number of wells	1	0	0	
Chloride (mg/L)	12.55	No Data	No Data	The Ontario 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)	11.60	No Data	No Data	The Ontario standard for nitrite and nitrate is 10 mg/L and is based on the maximum allowable concentration. Drinking water should not exceed this level.

Results reflect health at the well and should not replace testing at private wells.

Rating Scale:



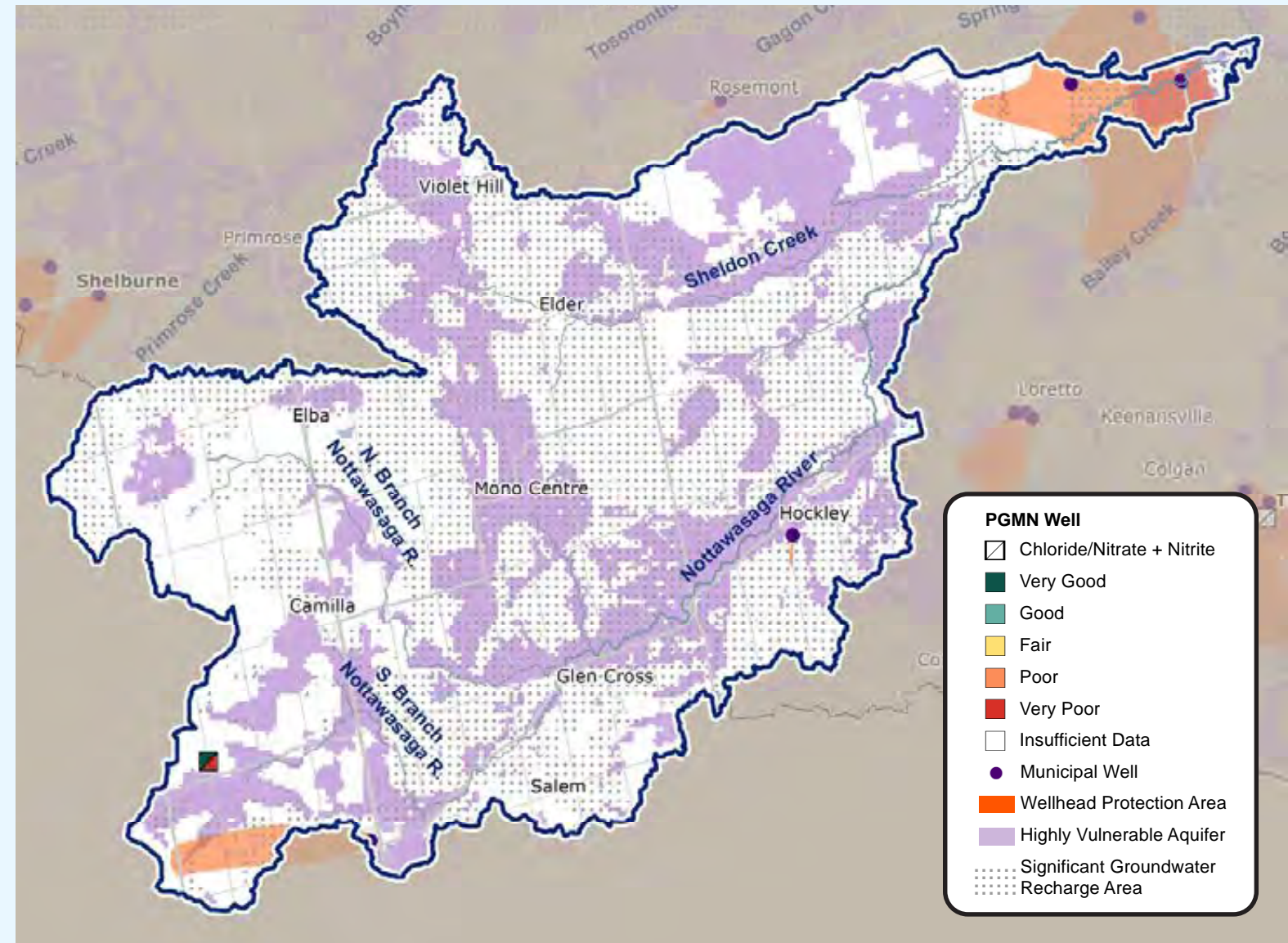
Ontario's Drinking Water Source Protection Program

Focuses on protecting municipal drinking water sources, including:

Wellhead Protection Areas areas that contribute water to municipal wells,

Highly Vulnerable Aquifers areas where groundwater is close to ground surface

Significant Groundwater Recharge Areas areas which feed the aquifers.





WATERSHED STEWARDSHIP



What is Watershed Stewardship?

Watershed Stewardship and Restoration is the responsible and sustainable care of our natural resources and wildlife within a watershed.

Protecting what we have, and enhancing and restoring where possible helps the environment, and protects human uses as well. As caretakers of our environment, we all need to implement stewardship practices that protect and restore natural resources.

We all depend on good stewardship of private and public lands to achieve healthy waters and sustainable ecosystems. With almost 96% of land in our watersheds privately owned, residents can play a critical role.



Forestry Program

The NVCA's Forestry Program provides trees, planting services and forest management advice for landowners throughout the watershed. Between 2002 and 2016, more than 1,691,000 trees have been planted on 363 properties, reforesting 890 hectares of land in the NVCA watershed. These future forests will help to moderate the effects of both drought and flooding, reduce soil erosion, provide habitat for wildlife, improve water quality and groundwater recharge, and mitigate climate change.

Healthy Waters Program

The NVCA's Healthy Waters Program provides landowners with free site visits, technical and financial support for eligible projects, such as tree planting, well decommissioning, stream bank stabilization, exclusion of livestock from streams and wetlands, prevention of manure runoff and nutrient management. Since 2002, landowners in the Upper Nottawasaga River subwatershed have undertaken 53 stewardship projects on their properties through the support of this program. These projects have improved water quality, enhanced fish and wildlife habitat, protected species at risk, and prevented toxic algae blooms & fish kills.

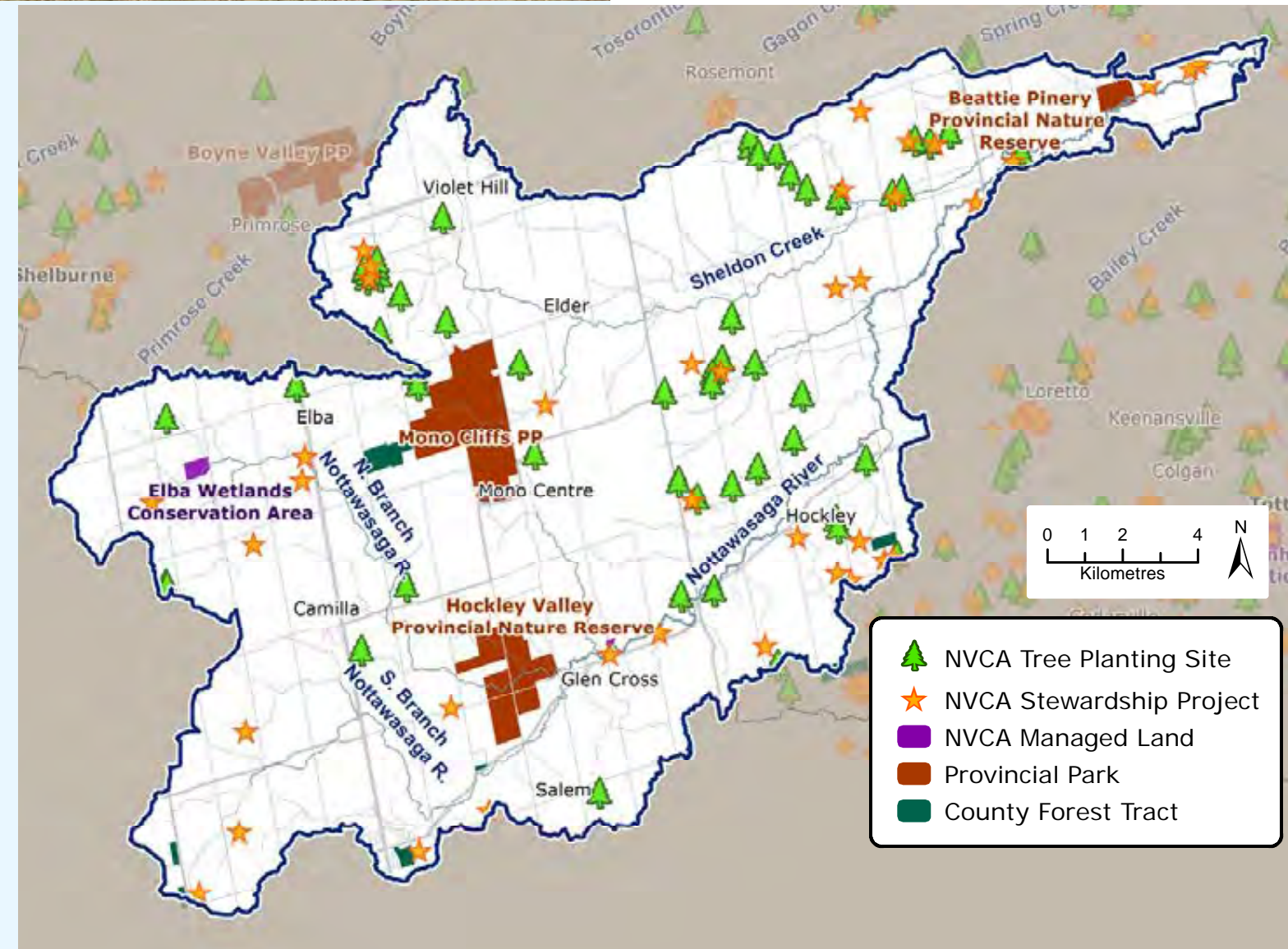
Landowner Grant Assistance

To assist landowners with protecting the environment, NVCA's Stewardship and Forestry Programs provide technical assistance and a range of grant incentives to help offset the cost of projects on private property.

Grant rates range from 25% to 100% of eligible project costs.

To discuss your land management and stewardship goals

Call us at
705-424-1479



WATERSHED STEWARDSHIP

RESTORATION PRIORITIES

Each subwatershed in the Nottawasaga Valley encompasses unique landforms and land uses. As a result, stream health trends and watershed restoration priorities differ across subwatersheds.

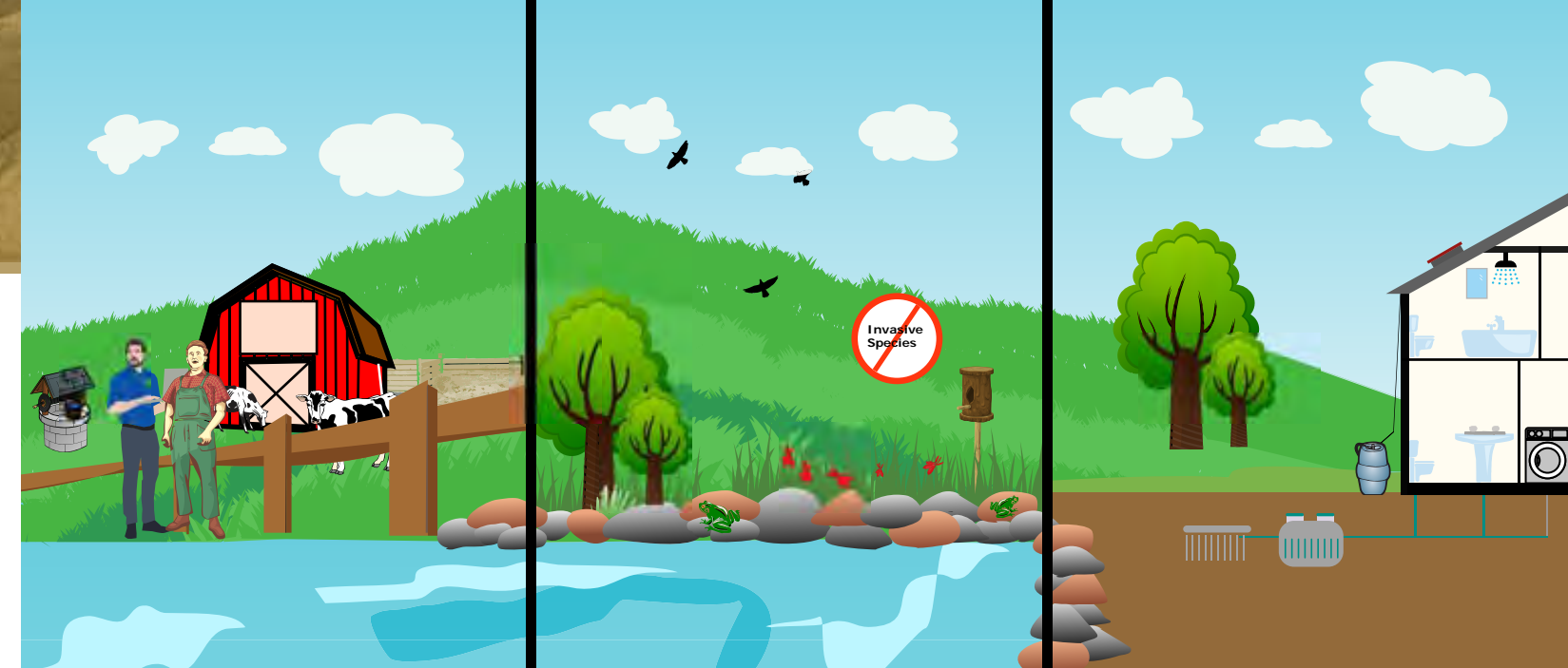
For example the Niagara Escarpment streams to the west are high quality trout streams. Consequently, the restoration priorities within this region align with opportunities to enhance these coldwater habitats as well as address broad water quality improvement objectives. Conversely the lower Nottawasaga River supports warmwater fish

species including Lake Sturgeon, a species at risk. The restoration priorities in this subwatershed are customized to enhance warmwater fish habitat as well as address other needs such as optimizing water quality at Wasaga Beach.

In addition to technical considerations, implementation of the restoration priorities would not be possible without the support from partners including local municipalities, environmental groups, landowners and generous funders.

Restoration Priorities for the Upper Nottawasaga Subwatershed

1. Improve water quality and fish habitat by completing stream-side tree planting, habitat- friendly streambank stabilization and installation of livestock exclusion fencing on the Nottawasaga River (downstream from Sideroad 20 Adjala) and on Sheldon Creek (downstream from the 4th Line Adjala).
2. Improve water quality and fish habitat by retrofitting dam structures to bottom discharge and removing dams in headwater reaches and tributary streams.
3. Reduce flooding by increasing soil infiltration rates (speed at which water penetrates the ground) across the watershed by; increasing natural vegetation cover, protecting and restoring wetlands, and adopting low impact development techniques in urban areas.
4. Reduce soil erosion and runoff of both nutrients (e.g. phosphorus) and fecal bacteria, to safeguard surface water (rivers and lakes) and groundwater. This can be achieved through agricultural stewardship practices, streambank stabilization and good septic care.



HOW YOU CAN MAKE A DIFFERENCE

Farm Stewardship

- Upgrade manure storages; divert clean water from barnyards 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 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

Urban Stewardship

- Conserve water in the home – install low flow toilets and showerheads; and in the garden with rain barrels, mulch and rain gardens
- Reduce use of fertilizers
- Don't pour anything down storm drains as these drains flow untreated into rivers and lakes
- Plant neighbourhood trees to moderate the effect of extreme heat and enhance urban spaces
- Support Low Impact Development to increase groundwater recharge and reduce urban flooding

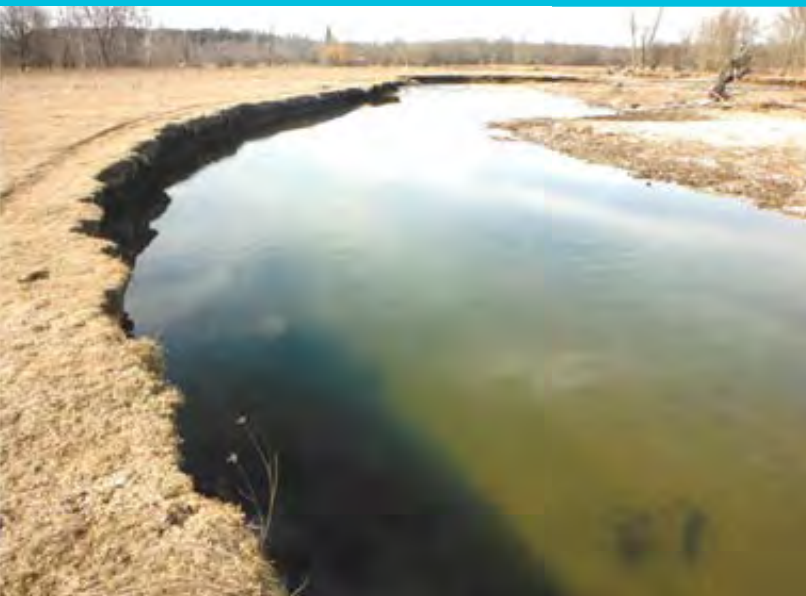
Habitat Restoration

- Protect and create stream and wetland buffers
- Plant natural vegetation between the water and adjacent land use practices
- Stabilize eroding stream banks
- Plant native trees, shrubs, wildflowers and grasses to support birds, pollinators and wildlife
- Learn to identify, safely remove and reduce spread of invasive species

Drinking Water Protection

- Decommission unused wells to prevent surface contaminants from reaching groundwater unfiltered
- Test your well for bacteria at least 3 times per year (your local health unit provides **free** testing)
- Regularly service your septic system (every 2-5 years) and avoid using cleaning products (like bleach) that kills the beneficial bacteria, on which your sewage treatment depends
- Properly dispose of household hazardous waste and pharmaceuticals
- Clean debris from around your well and ensure the lid is vermin proof
- Reduce micro-plastic contamination by installing a filter on you laundry machine

Before (Spring 2019)



After (Fall 2019)



An example of streambank restoration in the Upper Nottawasaga Valley subwatershed:
Example of a restoration project on the Upper Nottawasaga River which included installation of livestock exclusion fencing and habitat friendly streambank stabilization.

NVCA'S EDUCATION PROGRAMS

Over the past three decades, NVCA's Education Program has delivered high quality, hands on, environmentally based outdoor education.

Between 2010 and 2017 alone, 81,925 children and adults from within NVCA's jurisdiction and beyond participated in our programming. Thanks to a long-term partnership with the Simcoe County District School Board, our educators work with students at the Tiffin Centre for Conservation or at their schools to help them connect with local natural environments. NVCA also offers secondary school programming including Specialist High Skills Major certificate programs for high school students focused on their next steps at post-secondary school.

NVCA also develops public programming to help families connect with nature outside of school hours to increase human Eco Health. Active time in nature is known to improve mental and physical well-being, creativity and cognitive ability, while reducing stress, ADHD, depression, diabetes and heart disease.

Did you know that in addition to traditional summer camp, NVCA's programs now include stewardship, newcomer, junior leadership, and outreach camps? For more information about public programming such as drop-in events, festivals, and family nature days, visit www.nvca.on.ca.



‘Fostering a sense of wonder, appreciation and respect for the natural world through experiential learning and outdoor exploration’

PUBLIC LANDS MANAGEMENT

NVCA's land acquisition program focuses on strategic land securement for the long-term protection of natural features and functions. These properties also provide valuable recreational opportunities to watershed residents. The NVCA manages two properties within the Upper Nottawasaga River subwatershed totaling 33 ha.

County Forests are managed for a variety of environmental, social and economic purposes. There are two Simcoe and five Dufferin County Forest tracts, totaling 141 ha within the Upper 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 four park areas (1,139 ha) within this subwatershed.

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

IMPROVE YOUR ECOHEALTH IN OUR CONSERVATION AREAS

Natural areas clean our air, protect our water and can have a moderating effect on extreme weather. New research indicates that spending time in nature also provides important benefits that support mental health and emotional well-being.

NVCA owns and manages over 5,000 ha of land in the Nottawasaga Valley watershed, including 12 conservation areas with opportunities to hike, paddle, and fish. Here are some highlights of our conservation areas.

Tiffin Centre for Conservation

Located between Barrie and Angus, the Tiffin Conservation Area is home to NVCA's John Hix Conservation Administration Centre, and home to our Environmental Education Program. There are 18.5 km of looped trails that meander through a mixture of wetlands, forests, and open meadows.

Minesing Wetlands

Minesing Wetlands acts as an important natural flood control reservoir. During periods of high water levels, the wetland fills up with water and slowly releases it into downstream rivers and into Georgian Bay, protecting downstream communities including Wasaga Beach.

In addition to being a flood control mechanism, Minesing Wetlands is recognized as an internationally significant wetland because of its unique plant communities and diverse wildlife. Visitors can paddle, snowshoe or cross-country ski in this conservation area.

Elba Wetland (in this subwatershed)

Elba Wetland is one of the properties NVCA manages that is located within the Upper Nottawasaga Subwatershed. The property is owned by Ontario Heritage Trust and managed by NVCA. This property is being protected for its ecological values and is not publically accessible.

Through Section 28 of the Conservation Authorities Act, NVCA has the responsibility to regulate activities in natural and hazardous areas in order to prevent the loss of life and property due to flooding and erosion, and to conserve and enhance natural resources. For more information, please visit our website at nvca.on.ca.



Did you know...

Land donations to Conservation Authorities may be eligible for tax benefits?

Contact NVCA about leaving a legacy gift of land.



Nottawasaga Valley
Conservation Authority

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Member of



Conservation
ONTARIO

Thank you to all of our landowners, community groups, schools, businesses, municipalities and other government agencies who support stewardship activities in our watershed!