

Nottawasaga Valley **WATERSHED** 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 NOTTAWASAGA VALLEY WATERSHED

The NVCA is one of 36 Conservation Authorities across Ontario and is a proud member of Conservation Ontario.

Our watershed is approximately 3,700 km², with jurisdiction in 18 municipalities and is the source of watercourses that flow into Georgian Bay at Wasaga Beach, Collingwood and Severn Sound. It includes 35 km of Georgian Bay shoreline along the Wasaga Beach and Collingwood waterfront.

The watershed is shaped like a bowl – the Niagara Escarpment (west), Oak Ridges Moraine (south) and Simcoe Uplands/Oro Moraine (north and east) represent the height of land along the edges of the bowl. Streams arise from these high areas and flow down slope into the Simcoe Lowlands (the bottom of ancient Lake Algonquin), which forms the bottom of the bowl. These lowlands extend to Wasaga Beach and Collingwood (a “chip” at the edge of the bowl) which allows the Nottawasaga

River and Blue Mountain streams to reach Georgian Bay.

The NVCA watershed is largely rural in character, though urban areas such as Barrie, Alliston, Shelburne, Wasaga Beach and Collingwood continue to experience significant growth. Land use is dominated by agriculture; however, compared to many areas in southern Ontario, natural areas are a significant part of the landscape. Forests and wetlands are generally found in areas that are unsuitable for farming – where soils are too wet, dry, rocky or steep.



FOREST CONDITIONS

Status: Good
Trend: Insufficient Data

Forest conditions in the NVCA jurisdiction are generally good. Forest cover has recovered from historical lows in the early 1900s, but is currently under pressure from urban growth and agricultural conversion. Based on Global Forest Change analysis, between 2009 and 2016 there was a loss in watershed forest cover of 837 hectares (ha). Insufficient data was available to attribute forest loss to various land use sectors. Insufficient data was available to determine forest gain.

The Pine River and Willow Creek subwatersheds have the highest percentage of forest cover and forest interior habitat in the Nottawasaga River watershed. These areas collectively form an important natural corridor extending from the Niagara Escarpment to the Canadian Shield. You can see parts of the Canadian Shield as you're driving along Highway 11 north of Orillia into cottage country. Maintaining and enhancing ecological corridors will be important to allow forests and wildlife to adapt to climate change.

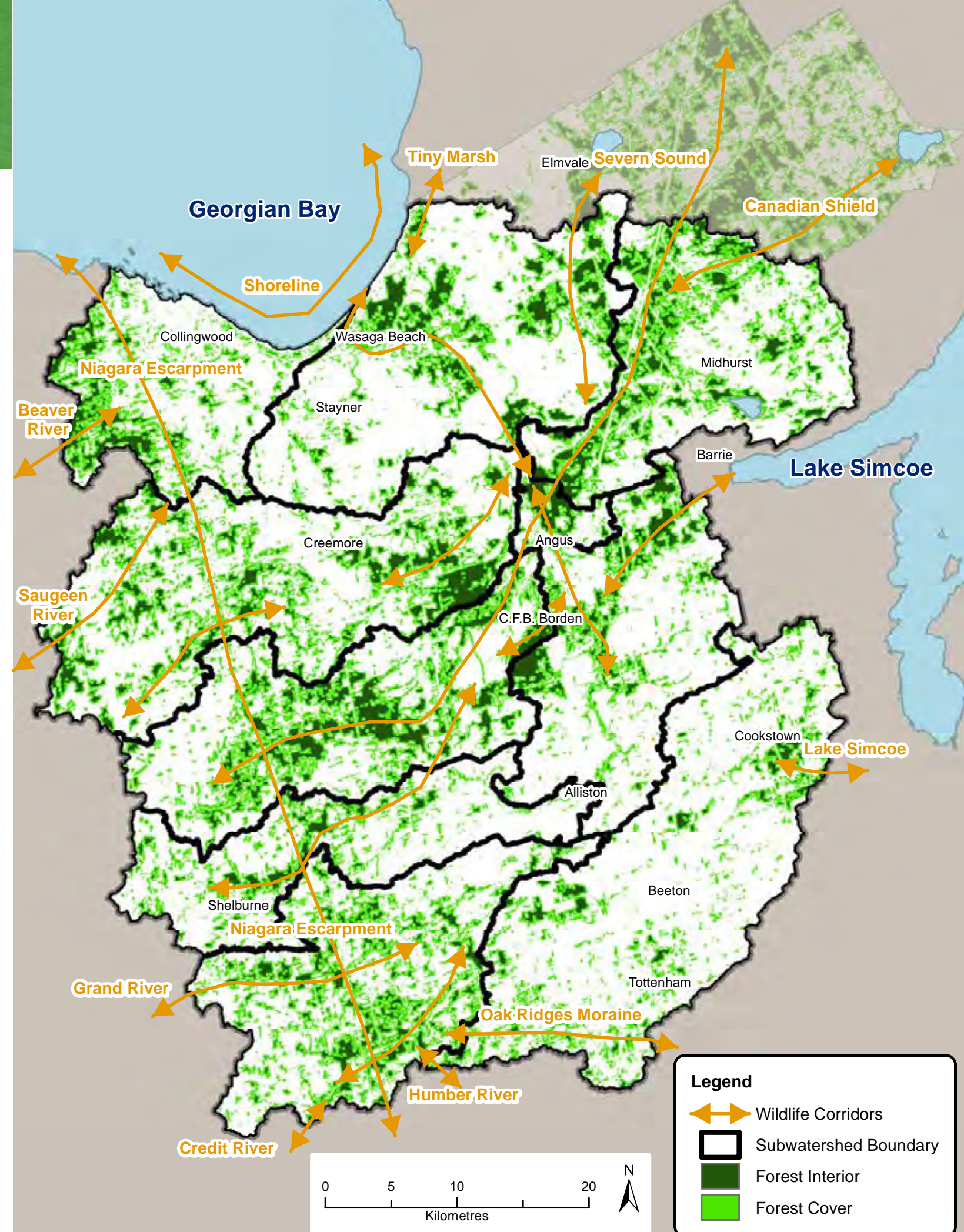
As shown by the orange arrows on the map, forests in NVCA watershed are also part of the Niagara

Escarpment system and form an important natural linkage between the Escarpment and the Oak Ridges Moraine. Headwater wetlands west of the Escarpment are connected to similar habitat in the Grand, Saugeen, Credit and Beaver River watersheds. Forests and wetlands are also linked to natural areas northward to Severn Sound and eastward to Lake Simcoe. The Georgian Bay shoreline is part of an important corridor for migrating waterfowl and shorebirds.

Did you know that rare forest communities are present within the watershed? A mosaic of rare pine-oak woodland and tallgrass prairie is found in the sand dunes of Wasaga Beach Provincial Park. The Minesing Wetlands hosts rare bur oak and hackberry forest swamps. The cliffs of the Niagara Escarpment support old-growth cedar stands. These rare communities are important to biodiversity in the watershed and often support rare species such as Eastern Hog-nosed Snake and Cerulean Warbler.

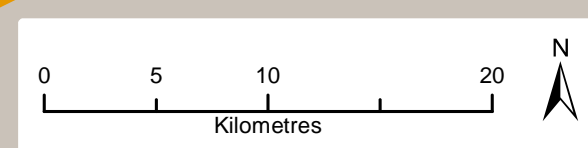
Indicators	Nottawasaga Valley Watershed	Indicator Description
Forest Cover	33.39%	Forest cover is the percentage of the watershed that is forested. Environment Canada suggests that 30% forest cover is the minimum needed to support healthy wildlife habitat; more coverage is beneficial.
Forest Interior	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	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:



Legend

- Wildlife Corridors (orange arrows)
- Subwatershed Boundary (black outline)
- Forest Interior (dark green)
- Forest Cover (light green)





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, marshes and fens (an open wetland dominated by low shrubs, ferns, sedges and grasses) in the Nottawasaga Watershed 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 within the NVCA Watershed meet Environment Canada's wetland habitat guidelines. Historically more than 70% of wetlands in southern Ontario have been lost due to urban development and agricultural conversion. These pressures continue today.

Based on satellite photo interpretation, between 2009 and 2016 there was a net watershed wetland loss of 444.4 hectares (ha). This represents a 0.9% decrease in wetland cover since 2008. Around 699

ha of wetland was converted to agricultural or urban development land uses. Most of the 254.9 ha of wetland gained was through natural regeneration

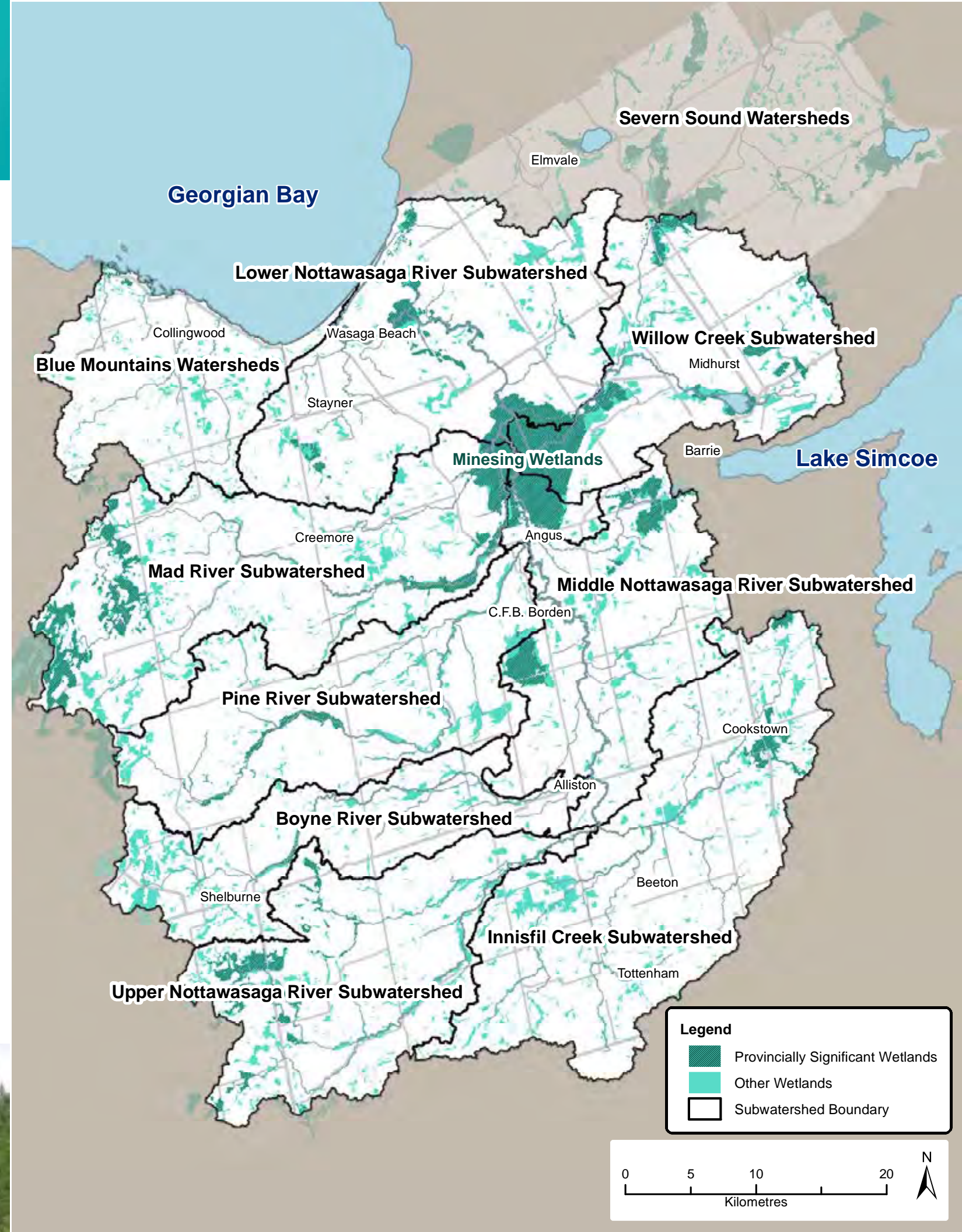
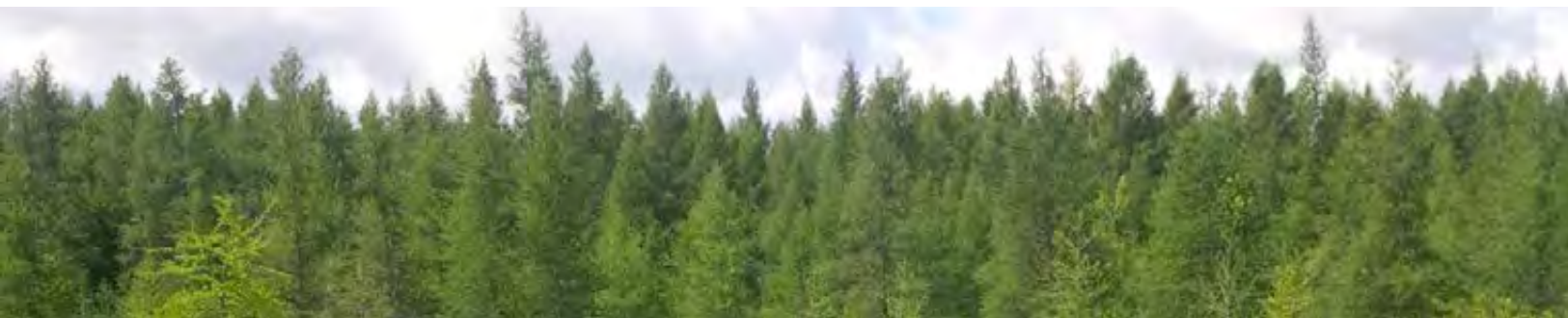
Large expanses of wetlands can be found on poorly drained lands west of the Niagara Escarpment and within the lowlands in the central portion of the watershed. Long, narrow wetlands are often found along river valleys as well as along the Georgian Bay shoreline.

The Ontario Ministry of Natural Resources and Forestry has identified 33 groups of wetlands within the watershed as provincially significant. Provincial and municipal planning policies help protect these wetlands from development.

Did you know that the Minesing Wetlands, located north of Angus, is recognized as an internationally significant wetland? It supports a number of rare plant and wildlife species and protects Wasaga Beach from flooding. The coastal wetland marshes along the Collingwood shoreline are found only in certain areas along the Great Lakes shorelines and are considered globally rare.

Indicators	NVCA Watershed	Indicator Description	Trend (2009-2016)
Wetland Cover	14.2%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	Down -444.4 ha
Wetland Buffer (100m buffer area)	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: Poor
Trend: Declining

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.

Within the NVCA jurisdiction, a network of streams and rivers originate from the Niagara Escarpment, Simcoe Uplands, the Oak Ridges Moraine and the Oro Moraine. Most rivers flow to the Nottawasaga River, which discharges into Georgian Bay at Wasaga Beach. The creeks and rivers in the Blue Mountain watersheds flow directly into Nottawasaga Bay in Collingwood. Our jurisdiction also includes 35 km of the Georgian Bay shoreline, along the Collingwood and Wasaga Beach waterfronts.

Streams that flow through healthy forests and wetlands, such as those on the Escarpment, are generally healthy. Streams that receive pollution

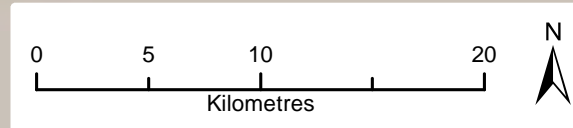
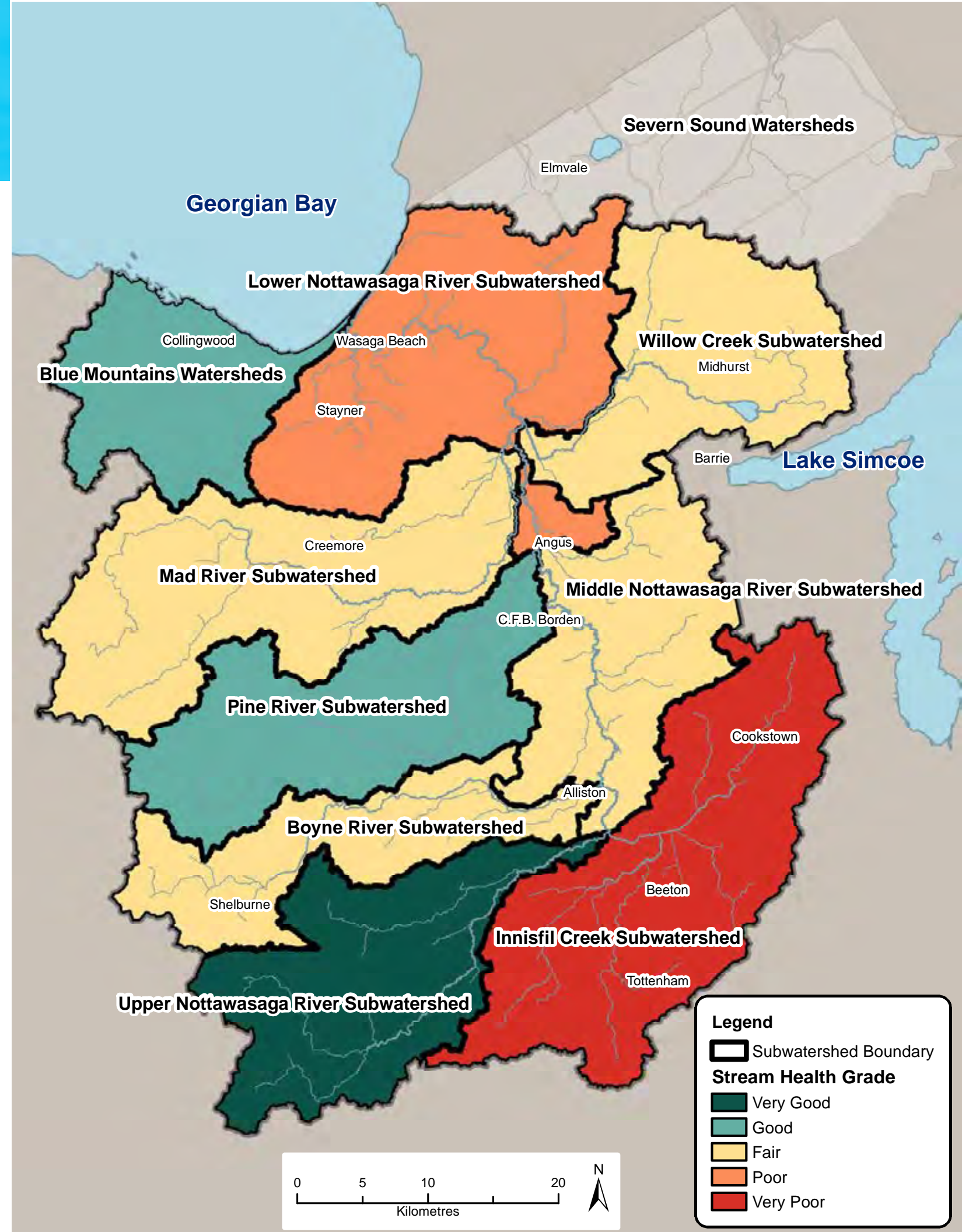
and sediment from highly urbanized or intensively farmed lowland areas are often unhealthy. Innisfil Creek is our most degraded watercourse system. As it flows into the Nottawasaga River, it degrades stream health in the Nottawasaga River significantly, a condition which continues all the way to Georgian Bay.

Recent studies conducted by NVCA and McMaster University have confirmed that high nutrient loading (phosphorous levels) and its aftereffects is the most significant water quality issue within the watershed. Runoff from agricultural lands and urban areas are the main sources of high nutrient concentrations. Landowner and community stewardship projects aimed at reducing nutrient loads are required to restore stream health.

Did you know that the Nottawasaga River system supports one of the largest spawning runs of Rainbow Trout and Chinook salmon in the Georgian Bay/Lake Huron basin? The river also supports critical spawning and nursery habitat for the endangered Lake Sturgeon.

Indicators	NVCA Watershed	Indicator Description	Indicator Trend (2012-2016)	Data Source and Trend (2012-2016)
Benthic Grade	1.17	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".	Down	18% of watershed stream length assessed; down 7%
Total Phosphorus (low flow; mg/L)	0.027	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 (NVCA Watershed range: 0.013-0.100 mg/L). Provincial Water Quality Guidelines suggest that levels greater than 0.03 mg/L result in unhealthy stream conditions.	No Change	18 chemistry stations; no change

Rating Scale:



Legend

- Subwatershed Boundary
- Stream Health Grade**
 - Very Good
 - Good
 - Fair
 - Poor
 - Very Poor



GROUNDWATER QUALITY

Status: Very Good
Trend: Insufficient Data

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 filters 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.

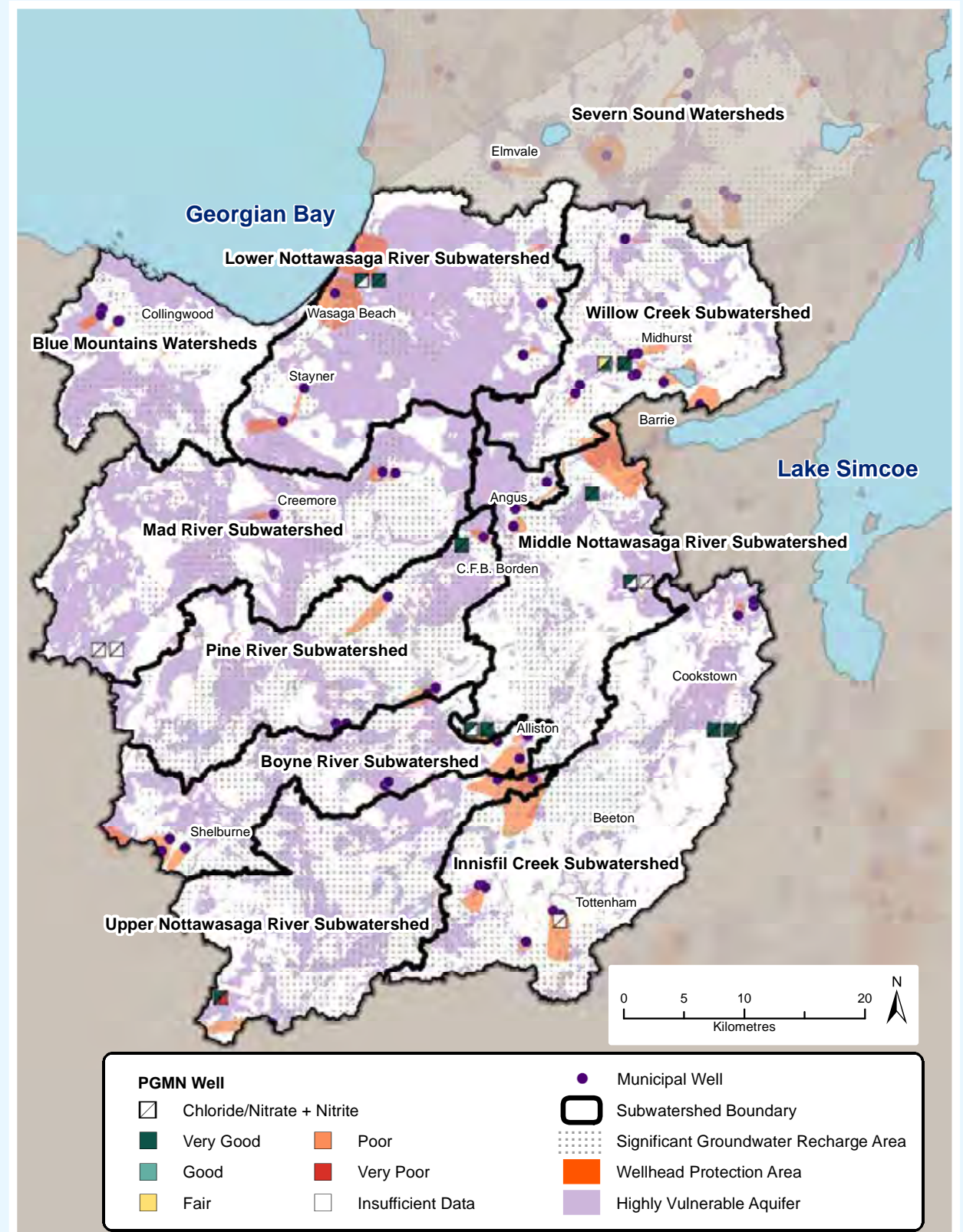
There are more than 130 municipal wells and 10,000 private wells located within the NVCA watershed. Through the Provincial Groundwater Monitoring Network (PGMN) partnership with the Ministry of the Environment, Conservation, and Parks, the NVCA monitors water levels and water quality in 16 wells located in various aquifers throughout the watershed. Twelve of these wells have sufficient data for reporting on current conditions. Groundwater quality monitoring began in 2003 and is now being conducted annually. Monitoring data allows the NVCA to track changes in the groundwater levels and quality over time.

The groundwater health at the well location in the NVCA watershed is considered very good for chloride and fair for nitrate in shallow wells and very good in intermediate and deep wells. Additional data is required to interpret broad groundwater quality trends in the subwatershed.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description
Number of wells	4	5	3	
Chloride (mg/L)	41.53	8.09	15.28	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)	5.83	0.47	0.05	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

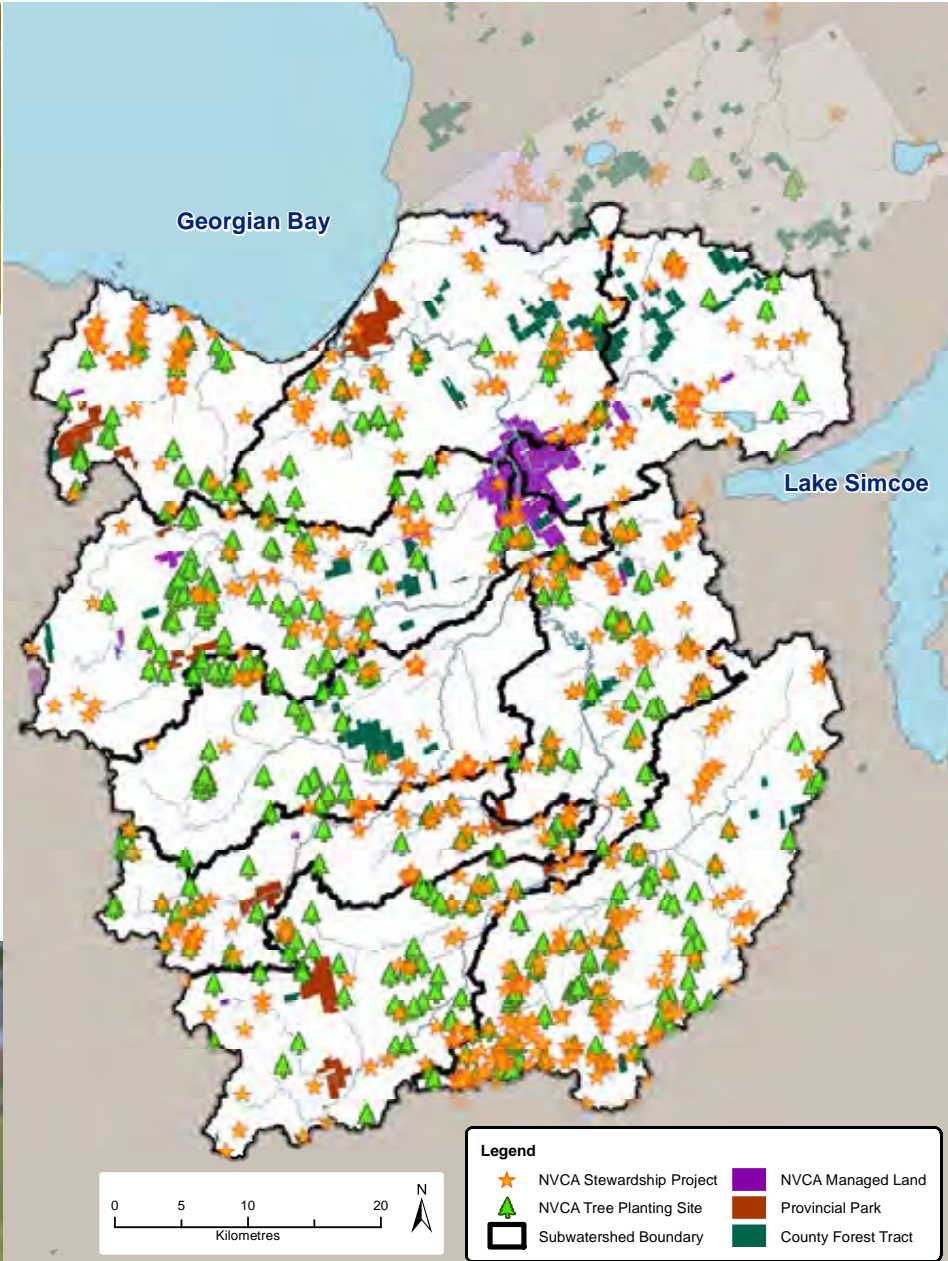


What is Watershed Stewardship?

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 Nottawasaga Valley Watershed have undertaken 935 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 Entire NVCA Area

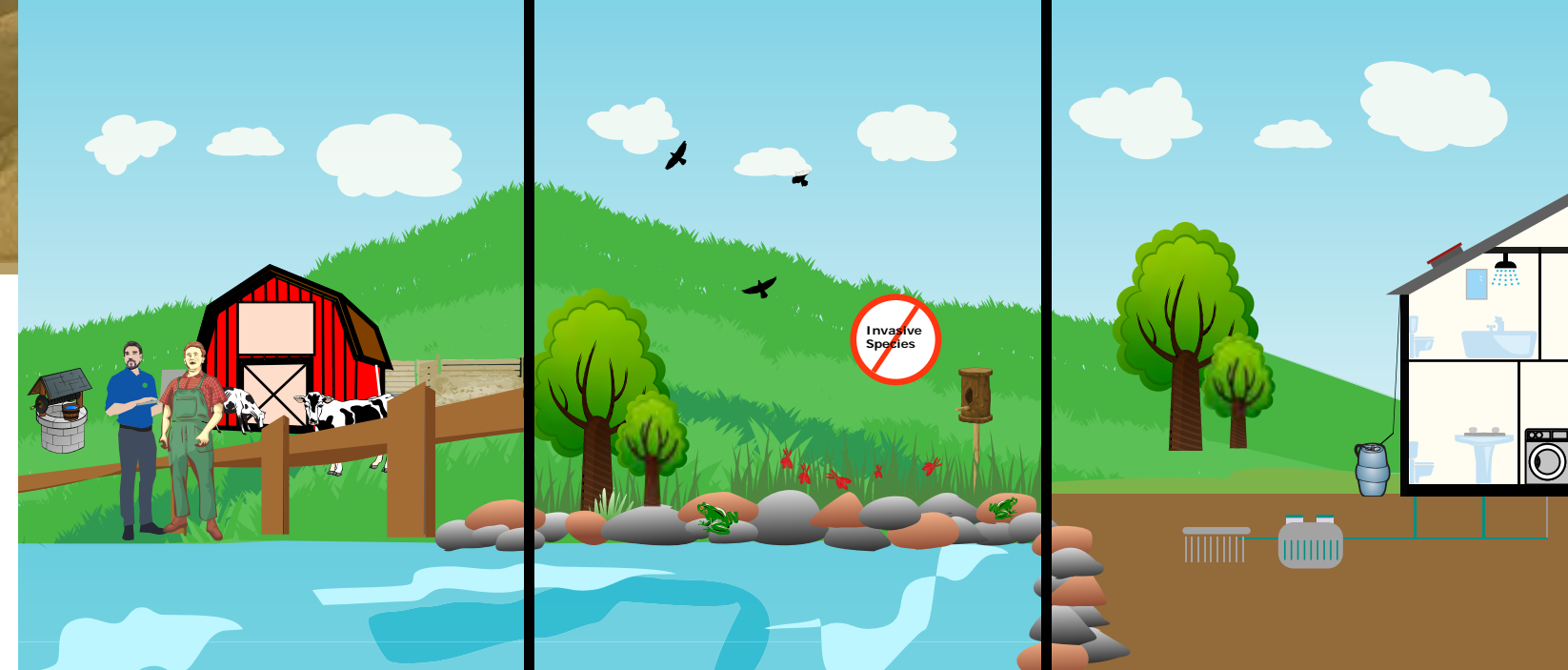
1. Improve water quality by establishing vegetated buffer strips and planting trees along watercourses.
2. Improve water quality by stabilizing eroding stream banks using fish habitat friendly techniques.
3. Improve fish habitat and reduce flooding by constructing new floodplains.
4. Improve water quality by constructing floodplain shelves, rock bottom habitats and meanders in sections of stream channel which have been altered to promote rapid drainage.
5. Improve fish habitat and water quality by removing old dam structures, creating fishways and converting dam structure to discharge cool water from the bottom of their head ponds.
6. Improve water quality by realigning stream channels out of roadside ditches into adjacent lands with natural vegetation cover.
7. 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 incorporating infiltration in urban areas.
8. 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 such as livestock exclusion fencing and good septic care.



Brook trout is an important cold water species in the Nottawasaga Valley Watershed.



NVCA biologists and provincial staff hold a 18kg Lake Sturgeon at the mouth of the Nottawasaga River. This fish had a radio transmitter implanted so biologists could follow it to its spawning area.



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

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. NVCA manages 25 properties within the Nottawasaga Valley Watershed totaling 4,877 hectares (ha).

County Forests are managed for a variety of environmental, social and economic purposes. There are 68 Simcoe, 13 Dufferin, two Grey County Forest tracts totaling 6,748 ha within the NVCA Watershed.

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 13 park areas (4,268 ha) within the NVCA watershed

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 the Nottawasaga River 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.

Nottawasaga Bluffs Conservation Area (in this subwatershed)

Nottawasaga Bluffs Conservation Area is one of the properties NVCA owns within the Mad River Subwatershed. This property is managed in partnership with the Blue Mountains Bruce Trail Club (BMBTC). BMBTC assists with the maintenance of the Bruce Trail that transects part of the property.

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!