NOTTAWASAGA WATERSHED Health Check 2023

Adjala-Tosorontio | Amaranth | Barrie | Blue Mountains | Bradford West Gwillimbury | CFB Borden | Clearview | Collingwood | Essa | Grey Highlands | Innisfil | Melancthon | Mono | Mulmur | New Tecumseth | Oro-Medonte | Shelburne | Springwater | Wasaga Beach





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 2023 Subwatershed Health Checks provide an overview of forests, wetlands, stream and groundwater health across the NVCA watershed between 2017 - 2021. 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 2023, 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 NVCA 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 Boyne River Subwatershed

Innisfil Creek Subwatershed

Lower Nottawasaga River Subwatershed

Mad River Subwatershed Middle Nottawasaga River Subwatershed

Pine River Subwatershed

Upper Nottawasaga River Subwatershed

Willow 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 2021.



OUR GRADING SYSTEM

VERY GOOD	An environment that is at or close to natural conditions		
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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		

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.

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: Declining

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.

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 jurisdiction are also part of the Niagara Escarpment system and form an important natural linkage between the Escarpment and the Oak Ridges Moraine. Headwater wetlands (river source areas) 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.

Watershed forest conditions are generally Good but are in decline. Forest cover decreased by 1.1% (1,235.9 ha) between 2008 and 2018. Forest interior decreased by 1.0% (383.9 ha) over this time period.

Indicators	Nottawasaga Valley Watershed	Indicator Description	Trend (2008-2018)
Forest Cover	32.2% (115,021 ha)	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.	-1235.9 ha (-1.1%)
Forest Interior	10.2% (36,506 ha)	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.	-383.9 ha (-1.0%)
Riparian Cover	68% (22,601 ha)	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.	Insufficient data

VERY GOOD GOOD FAIR POOR VERY POOR NO DATA



WETLAND CONDITIONS

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 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 River 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. Ducks Unlimited data identifies 49.7% wetland loss in the watershed between 1800 and 2002. From 2002 to 2016, an additional net wetland loss of 1.6% (700.1 ha) occurred.

Based on satellite photo interpretation, between 2016 and 2018 there was a net watershedwide wetland loss of 79.0 hectares (ha). This represents a 0.2% decrease in wetland cover since 2016.

Around 424.9 ha of wetland was converted to agricultural or urban development land uses. The 345.9 ha of wetland gained was through natural regeneration in low-lying areas.

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	14.5% (51,956 ha)	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	–79.0 ha (-0.2%)
Wetland Buffer (100m buffer area)	49.6% (30,4013 ha)	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:					
VERY GOOD	GOOD	FAIR	POOR	VERY POOR	NO DATA



STREAM HEALTH

Status: Poor 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 are determined by merging these two factors.

In 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.

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 As graded in the lower river reach	Indicator Description	Indicator Trend (2012-2021)	Data Source and Trend (2017-2021)
Benthic Grade (overall)	1.86	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	21% of watershed stream length assessed; up 3%
Total Phosphorus (low flow; mg/L; lower river)	0.037	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: 0.015-0.075 mg/L). Provincial Water Quality Guidelines suggest that levels greater than 0.03 mg/L result in unhealthy stream conditions.	Declining	18 chemistry stations; no change

Rating Scale:

VERY GOOD	GOOD	FAIR	POOR	VERY POOR	NO DATA
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GROUNDWATER QUALITY

Very Good- deep and

Good- shallow wells

intermediate wells

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 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 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.

Status:

There are more than 130 municipal wells and 10,000 private wells located within NVCA watershed. Through the Provincial Groundwater Monitoring Network (PGMN) partnership with the Ministry of the Environment, Conservation, and Parks, NVCA monitors water levels and water quality in 17 wells located in various aquifers throughout the watershed. Thirteen of these wells have sufficient data for reporting on current conditions. Groundwater quality monitoring began in 2003 and has been conducted annually since 2008. Monitoring data allows 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.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description	
Number of wells	4	5	4		
Chloride (mg/L)	78.2	9.7	17.6	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)	2.2	0.6	0.1	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:

GOOD	FAIR	POOR	VERY POOR	NO DATA
	GOOD	GOOD FAIR	GOOD FAIR POOR	GOOD FAIR POOR VERY POOR



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.

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





Forestry Program

NVCA's Forestry Program provides trees, planting services and forest management advice for landowners throughout the watershed. Between 2002 and 2021, more than 2.3 million trees have been planted on 669 properties, reforesting 1,384 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

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. From 2002 to 2021, landowners in the Nottawasaga River watershed have undertaken 1,246 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.



WATERSHED STEWARDSHIP

RESTORATION PRIORITIES

Each subwatershed in the Nottawasaga Valley encompasses unique landforms and land uses. As a result, restoration priorities differ across subwatersheds to their local needs. Healthy waters depend on a healthy watershed; the lands that drain into them.

Engaging landowners, farmers and volunteers in voluntary, hands-on stewardship projects to restore and protect natural infrastructure creates climate resilient landscapes and communities. Habitat restoration of wetlands, rivers, forests, native grasslands and certain farming practices help create carbon-rich, 'spongy' soils. Healthy soils increase flood attenuation, drought resilience, and reduce pollution-runoff. Other benefits include including reduced water pollution and maintaining cool river temperatures.

The implementation of the restoration priorities would not be possible without support from our partners including local municipalities, environmental groups, landowners and funders.

Restoration Priorities for the Entire NVCA Area

- 1. Improve water quality by stabilizing eroding stream banks using fish habitat friendly techniques, establishing vegetated buffer strips and planting native trees and shrubs along watercourses.
- 2. Reduce flooding by constructing new floodplains, increasing soil infiltration rates across the watershed by increasing natural vegetation cover, protecting and restoring wetlands, encouraging farm soil health practices, and adopting low impact development techniques in urban areas.
- 3. Reduce soil erosion and runoff of nutrients (e.g. phosphorus) and fecal bacteria, to protect streams, lakes and groundwater through agricultural stewardship practices, such as livestock exclusion fencing and nutrient management, streambank stabilization and good septic care.
- 4. Improve by constructing floodplain shelves, rock bottom habitats and meanders in sections of altered stream channel to promote rapid drainage.
- 5. Improve fish habitat and water quality by removing old dam structures, creating fishways and converting dam structure to bottom discharge.
- 6. Protect biodiversity and species at risk by restoring forests, wetlands, native grasslands, aquatic habitats and managing invasive species (such as Phragmites).

Before (2020)

After (2020)



An example of streambank restoration in the NVCA watershed: Stream realignment project completed to bypass an eroding streambank and create better riffle spawning habitat.



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

NVCA's Environmental Education Program has been delivering high-quality programming for over 40 years. During 2009-2022, we have collectively interacted with more than 132,000 students whom have visited us at the Tiffin Centre for Conservation, or we have been invited to visit school yards and green spaces to deliver outdoor programming within their communities.

Our current inventory of over 40 different programs cover topics of Science and Technology, Art, Cultural History, Geography, Survival Skills and Outdoor Recreation which increasingly incorporates Indigenous ways of knowing. Further, the NVCA Education Program has always kept step with provincial curriculum while addressing real time environmental issues, opportunities and solutions.

As such, the most recent program developments have included a climate change program for elementary students, and will soon include one for secondary schools.

We hire professionals from a wide variety of expertise including Ontario College of Teachers educators, and graduates from science, environmental studies, music, art and recreation, creating a team rich in diverse skills, abilities and knowledge. This enables NVCA wto provide watershed students with the best knowledge and opportunities from the most qualified educator for the subject. 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 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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Thank you to all of our landowners, community groups, schools, businesses, municipalities and other government agencies who support stewardship activities in our watershed!