

MAD RIVER SUBWATERSHED

Health Check 2023

Adjala-Tosorontio | Clearview | CFB Borden |
Grey Highlands | Melancthon | Mulmur | Springwater



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

Middle Nottawasaga River Subwatershed

Boyne River Subwatershed

Pine River Subwatershed

Innisfil Creek Subwatershed

Upper Nottawasaga River Subwatershed

Lower Nottawasaga River Subwatershed

Willow Creek Subwatershed

Mad River 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.



Forest Conditions



Wetland Conditions



Stream Health



Groundwater Quality



Watershed Stewardship

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?



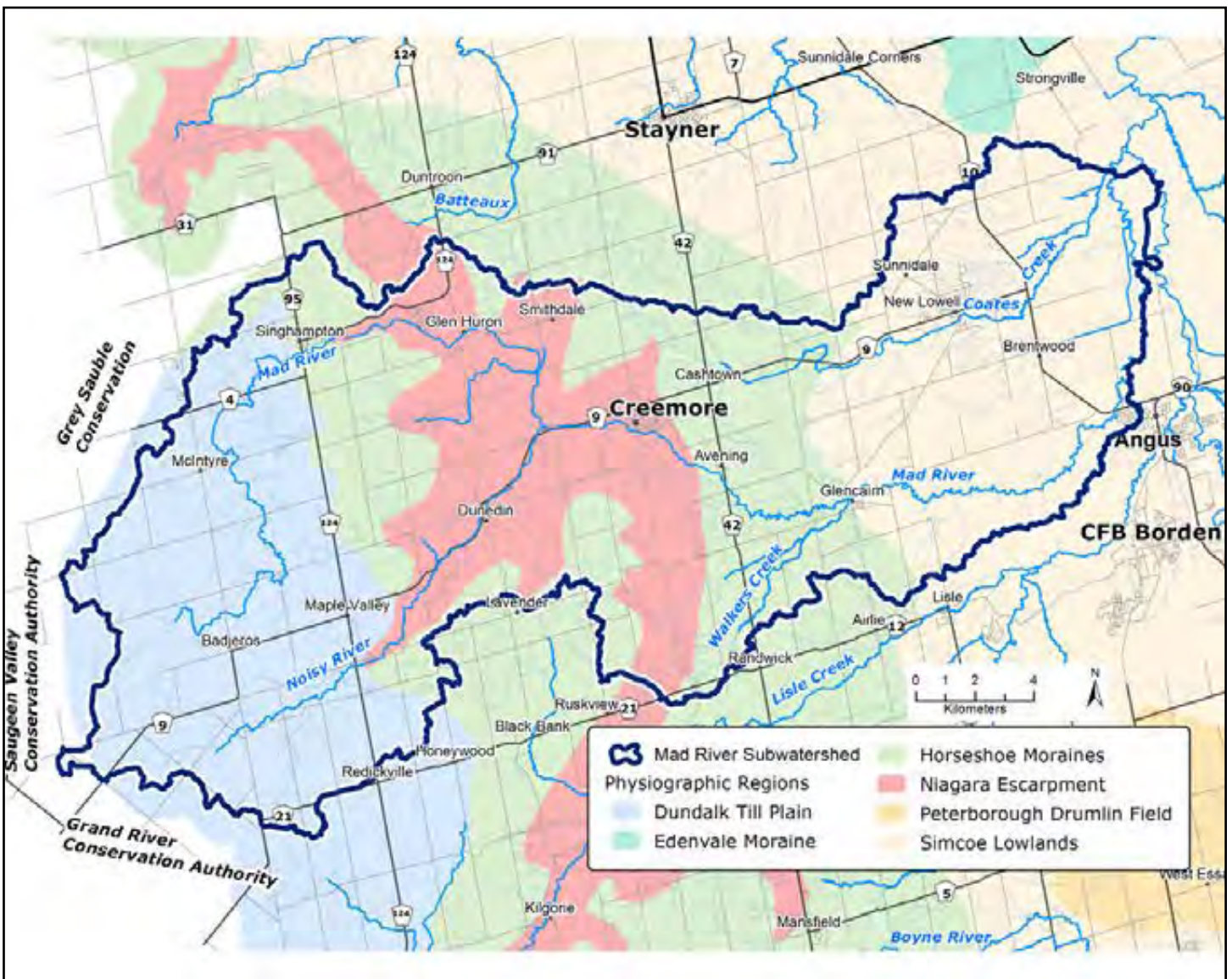
ABOUT THE MAD RIVER SUBWATERSHED

The Mad River arises as two stream branches (Mad River and Noisy River) within a series of wetlands west of the Niagara Escarpment. Both rivers meander eastward through a mix of agricultural lands and wetlands approaching the Escarpment east of Highway 124. Within the Escarpment zone (World Biosphere Reserve), the Mad and Noisy Rivers cascade through deep, well-forested valleys, converging west of Creemore.

From Creemore through Avening, the Mad River flows through a broad agricultural plain. Near Glencairn, the river enters a forested valley system that extends downstream to Angus. Flowing north, the Mad River enters the Minesing Wetlands where it discharges to the Nottawasaga River.

Coates Creek arises on the broad agricultural ridge northwest of Cashtown. The creek flows eastward through agricultural sand plains and wetlands before entering a reservoir at the New Lowell Conservation Area. Downstream of the reservoir, Coates Creek discharges to the Mad River within the Minesing Wetlands.

Walkers Creek is a smaller stream system that flows eastward from the Escarpment slopes east of Randwick, entering the Mad River near Glencairn. The south branch (Walkers Creek) flows through a series of wetlands and forested valleys while the north branch (Mud Creek) flows through an agricultural landscape.





FOREST CONDITIONS

Status: Good

Trend: Declining

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

Forest cover is concentrated in the headwater (river source area) swamps west of the Escarpment and in the wetlands/forests downstream of Glencairn. Till plains west of the Escarpment and flat valley floors and sand plains east of the Escarpment are well suited for agriculture and support less forest cover.

Escarpment forests near Singhampton are provincially significant, supporting several rare fern species as well as a variety of nesting bird species. Mixed and coniferous forests within the headwater swamps, along the Escarpment and in the river valley through CFB Borden provide shelter and food for deer during the harsh winter months.

As shown with orange arrows in the map, the headwater forests provide important linkages to adjacent natural areas within the Nottawasaga River, Saugeen River, Beaver River and Grand River watersheds. Escarpment forests are part of a larger provincial-scale natural corridor that extends from Niagara Falls to Tobermory. The Mad River valley provides a fragmented natural corridor from the Escarpment downstream to the Minesing Wetlands.

Subwatershed forest conditions remain Good; however, they are declining. Forest cover decreased by 0.4% (58.8 ha) between 2008 and 2018. Forest interior decreased by 3.5% (183.3 ha) over this time period.

Indicators	Mad River Subwatershed	NVCA Watershed	Indicator Description	Trend (2008-2018)
Forest Cover	34.9% (15,783 ha)	32.2%	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.	-58.8 ha (-0.4%)
Forest Interior	11.2% (5,249 ha)	10.2%	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.	-183.3 ha (-3.5%)
Riparian Cover	72.0% (3,502 ha)	68%	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

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 Mad River 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 Mad River subwatershed meet Environment Canada's wetland habitat guidelines and are considered generally healthy. However, historical wetland loss has been significant. Data from Ducks Unlimited Canada indicate historical wetland loss of 33.6% within the subwatershed (1800 to 2002). From 2002 to 2016, an additional net wetland loss of 0.7% (52.3 ha) occurred.

In the Mad River subwatershed, based on satellite photo interpretation, between 2016 and 2018 there was a net wetland loss of 24.2 hectares (ha). This represents a 0.3% decrease in wetland cover since 2016. Wetland gains (39.5 ha) were associated with natural regeneration in low-lying areas. Wetland loss (63.7 ha) was generally associated with agricultural conversion.

Large wetlands are found west of the Niagara Escarpment in the headwaters of the Mad and Noisy Rivers. A mosaic of wetlands is present in the lowlands east of Avening and along the Mad River valley through Base Borden, merging with the Nottawasaga River in the Minesing Wetlands.

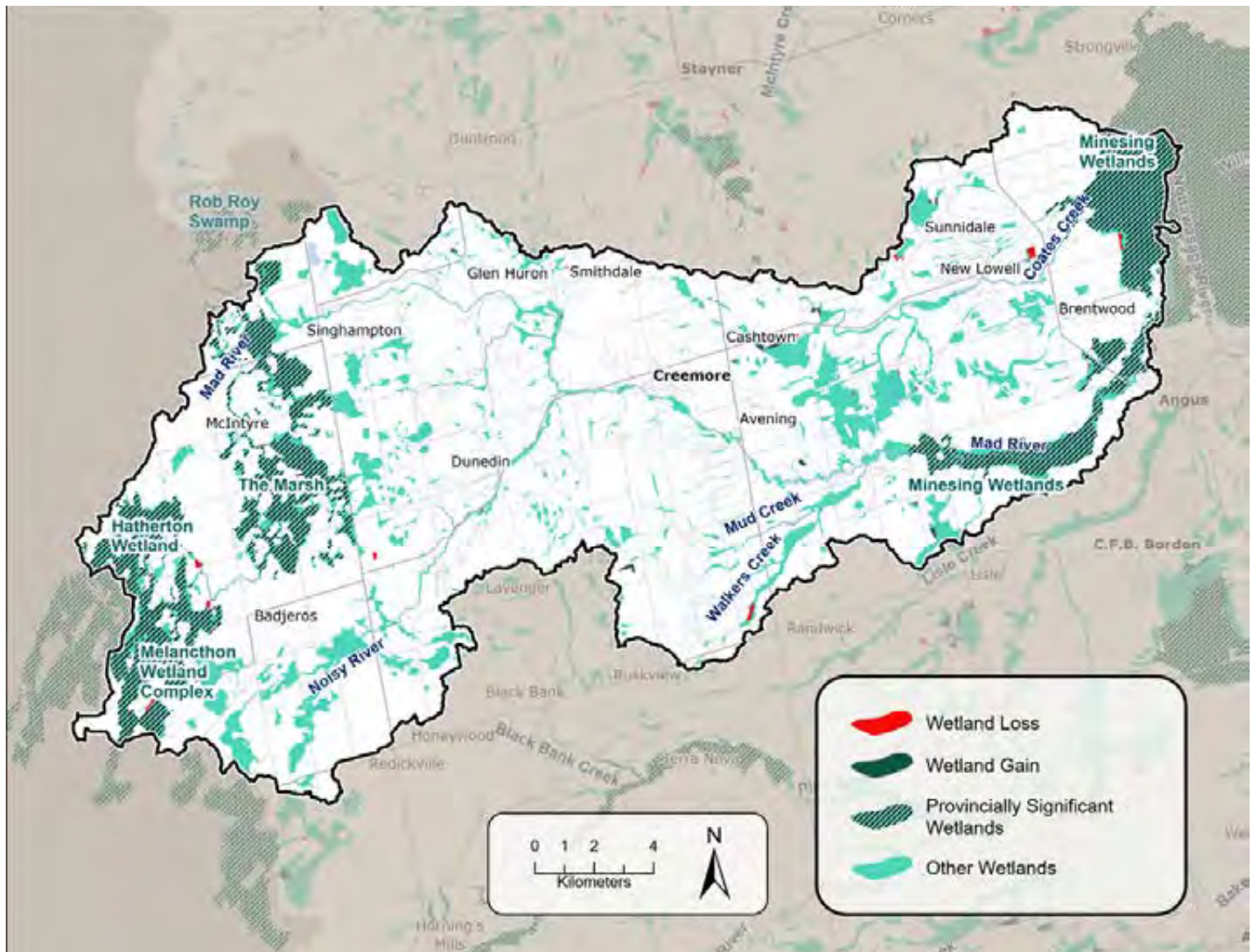
At over 6,000 hectares, the Minesing Wetlands is recognized as internationally significant because of its important ecological, economic and cultural values. A rare Buttonbush thicket swamp is found at the junction of the Mad and Nottawasaga Rivers, while nearby marshes support a variety of threatened and endangered bird species. The Minesing Wetlands provide critical flood control functions for Wasaga Beach, holding back upstream floodwaters for several days before slowly releasing flows into the Nottawasaga River.

Five groups of wetlands located partly within in the Mad River subwatershed have been identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry: Melancthon Wetland Complex, Hatherton Wetland Complex, The Marsh, Rob Roy Swamp and the Minesing Wetland Complex. Provincial and municipal planning policies help protect these wetlands from development and site alteration. The wetlands west of the Escarpment in the headwaters of the Noisy River are unevaluated and should be evaluated to determine their significance.

Indicators	Mad River Subwatershed	NVCA Watershed	Indicator Description	Trend (2016-2018)
Wetland Cover	19.1% (8,617 ha)	14.5%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	-24.2 ha (-0.3%)
Wetland Buffer (100m buffer area)	48.1% (4,164 ha)	49.6%	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: Fair

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.

Stream health in the Mad River subwatershed ranges from Unimpaired to Impaired. The Mad and Noisy Rivers and their tributaries support healthy resident and migratory trout populations.

The Mad and Noisy Rivers alternate Below Potential and Unimpaired grading as they flow through wetland and rural areas west of the Niagara Escarpment. Stream sections that are graded Below Potential often coincide with stream channel alterations, agricultural drainage and the extensive clearing of trees and other natural cover. Stream health improves as these rivers enter the Escarpment area. Extensive forest cover and groundwater discharge (springs) through this zone support excellent trout habitat. Large online ponds on the Mad River in Singhampton and Glen Huron contribute to Impaired conditions by warming temperatures and promoting algae growth.

East of the Escarpment, Mad River stream health improves to Unimpaired through Creemore before declining to Below Potential as it enters an agricultural landscape with relatively sparse forest cover. The River remains in Below Potential

conditions further east through Glencairn, before improving to Unimpaired as the river flows through dense forest stands in Base Borden. Stream health rapidly declines to Impaired as the Mad River flows through Angus towards the agricultural fields to the north, before entering the Minesing Wetlands.

Coates Creek flows through an agricultural landscape and its health ranges from Below Potential to Impaired. This is due to sparse riparian (streambank) cover next to farm fields, extensive channel alteration, gravel pits and urban areas. A small forested valley system west of New Lowell provides enough groundwater inputs to raise the stream health in Coates Creek to Below Potential for a brief period. The dam at New Lowell Conservation Area and its head pond impacts stream health significantly lowering the grade to Impaired, a condition which persists downstream to the Minesing Wetlands.

Walkers Creek and Mud Creek are in good health through the Escarpment, except where online ponds cause impairment. Sparse riparian cover and livestock impacts degrade stream conditions downstream of the Escarpment.

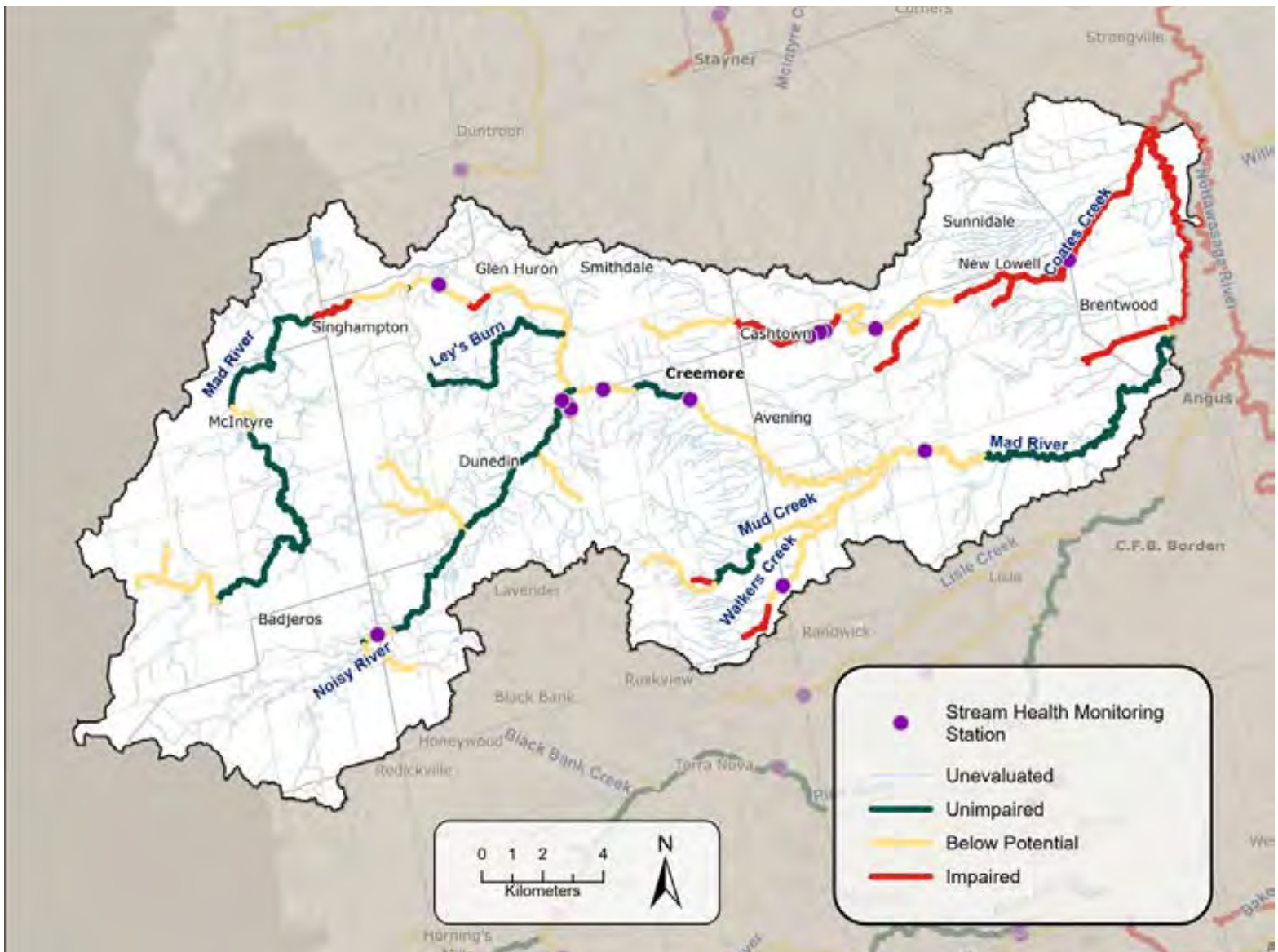
Nutrient concentrations (total phosphorus) are generally low at the Glencairn water quality sampling station, however algae growth remains high, reflecting the Below Potential stream health grades in section of the river.

Overall, stream health has not changed in the Mad River since the 2013 Health Check. The 2018 Watershed Health Check assessed 21% of the river length in the Mad River subwatershed, down from 22% in 2013.

Indicators	Mad River Subwatershed	Indicator Description	Indicator Trend (2012-2021)
Benthic Grade	2.12	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)	0.018	Total phosphorus indicates nutrient levels within a stream. Our healthiest streams have levels less than 0.01 mg/L during low flow conditions. Mad River range in all conditions: 0.005—0.099 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

Data availability: 7 of 8 years (2014 - 2021)

Status:

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 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 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.

In the Mad 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, NVCA monitors water levels and water quality at three PGMN wells in this subwatershed. Groundwater monitoring began in 2014 and sampling has been conducted annually since 2014, allowing NVCA to track changes in groundwater levels and quality over time; however, there is insufficient data to evaluate water chemistry with a minimum of 10 years of data required.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description
Number of PGMN wells	1	1	1	
Chloride (mg/L)	Insufficient Data	Insufficient Data	Insufficient 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)	Insufficient Data	Insufficient Data	Insufficient 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:



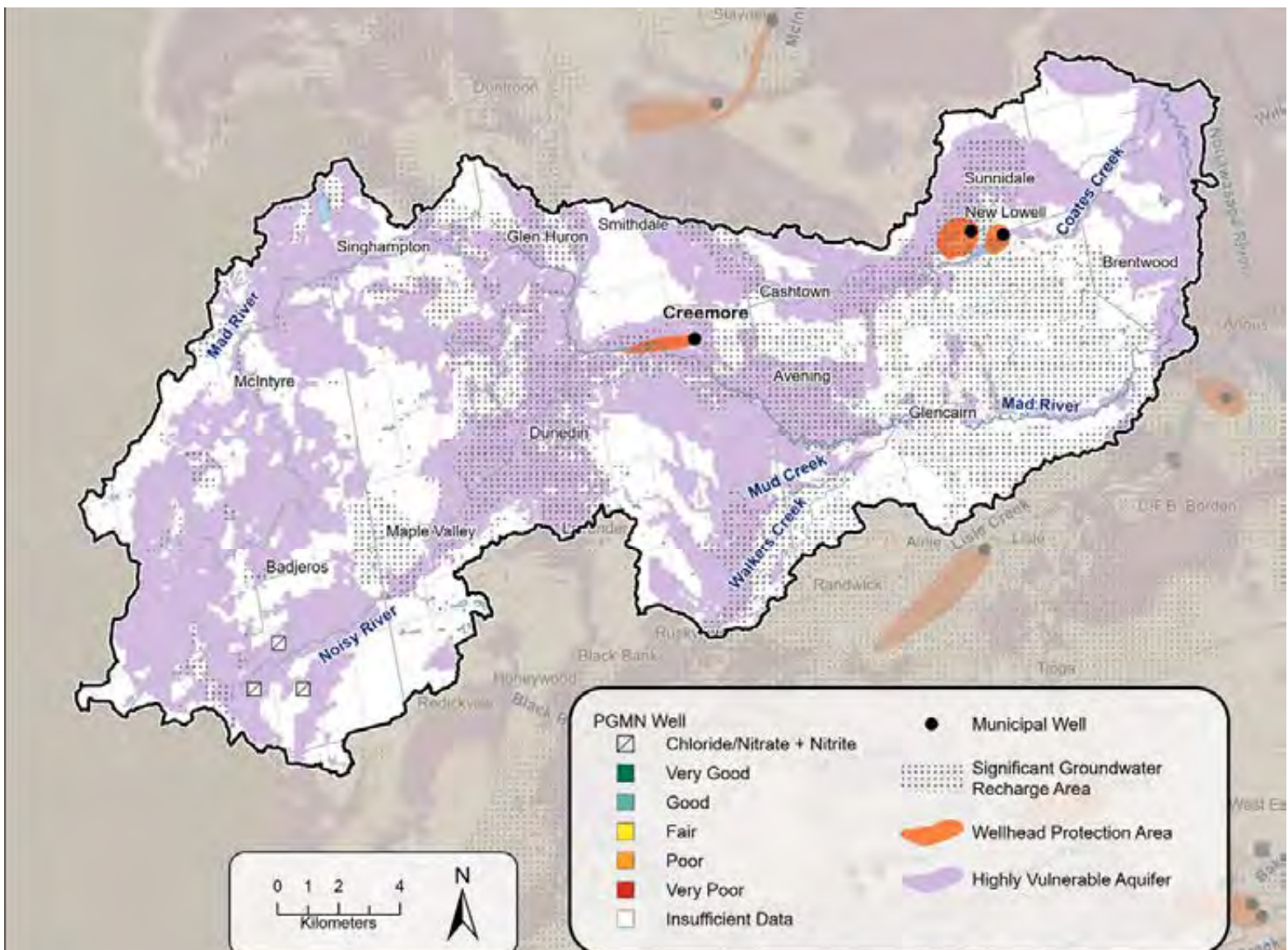
Ontario's Drinking Water Source Protection Program

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.

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**



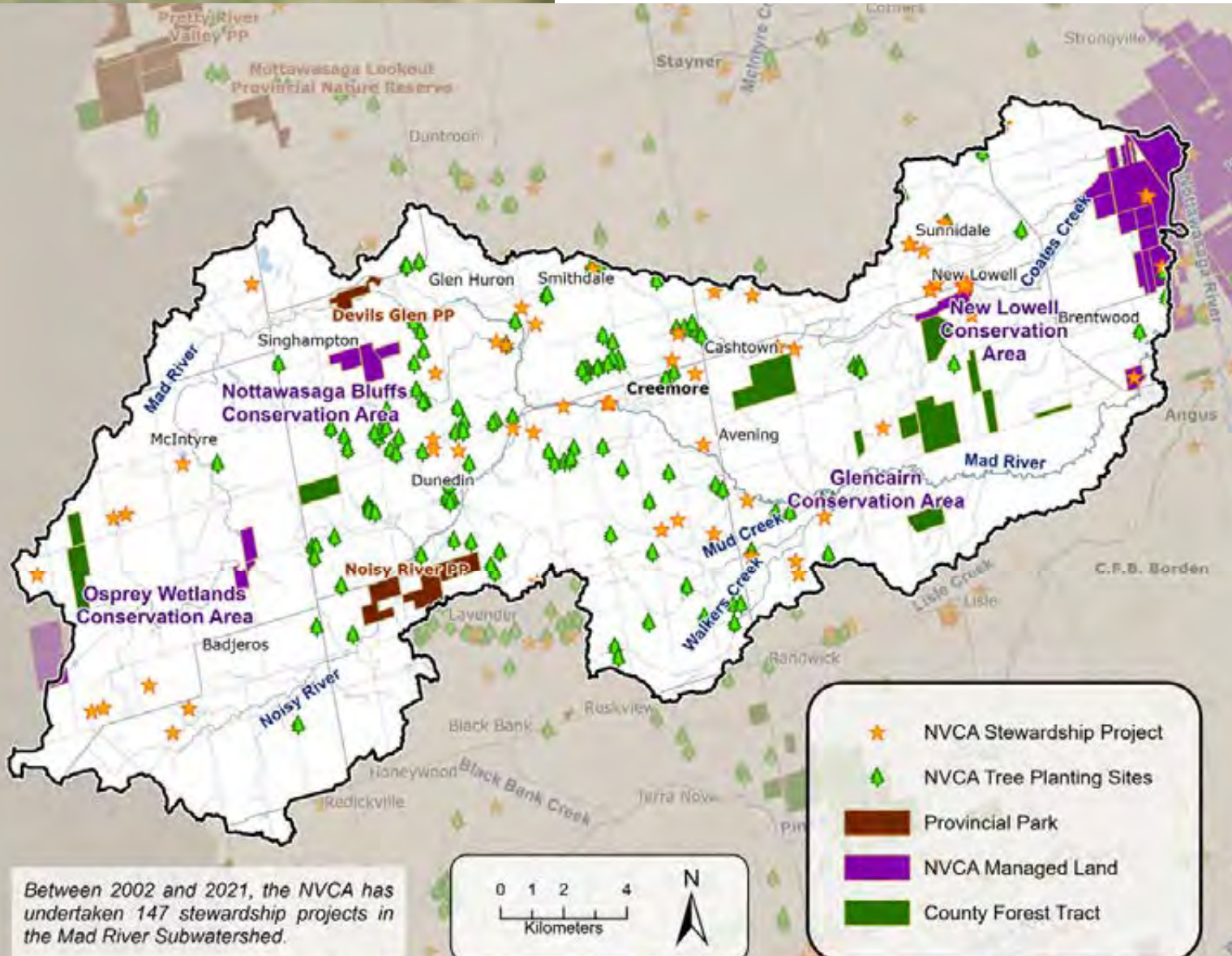


Forestry Program

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 Mad River subwatershed have undertaken 112 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.



Between 2002 and 2021, the NVCA has undertaken 147 stewardship projects in the Mad River Subwatershed.



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 Mad River Subwatershed

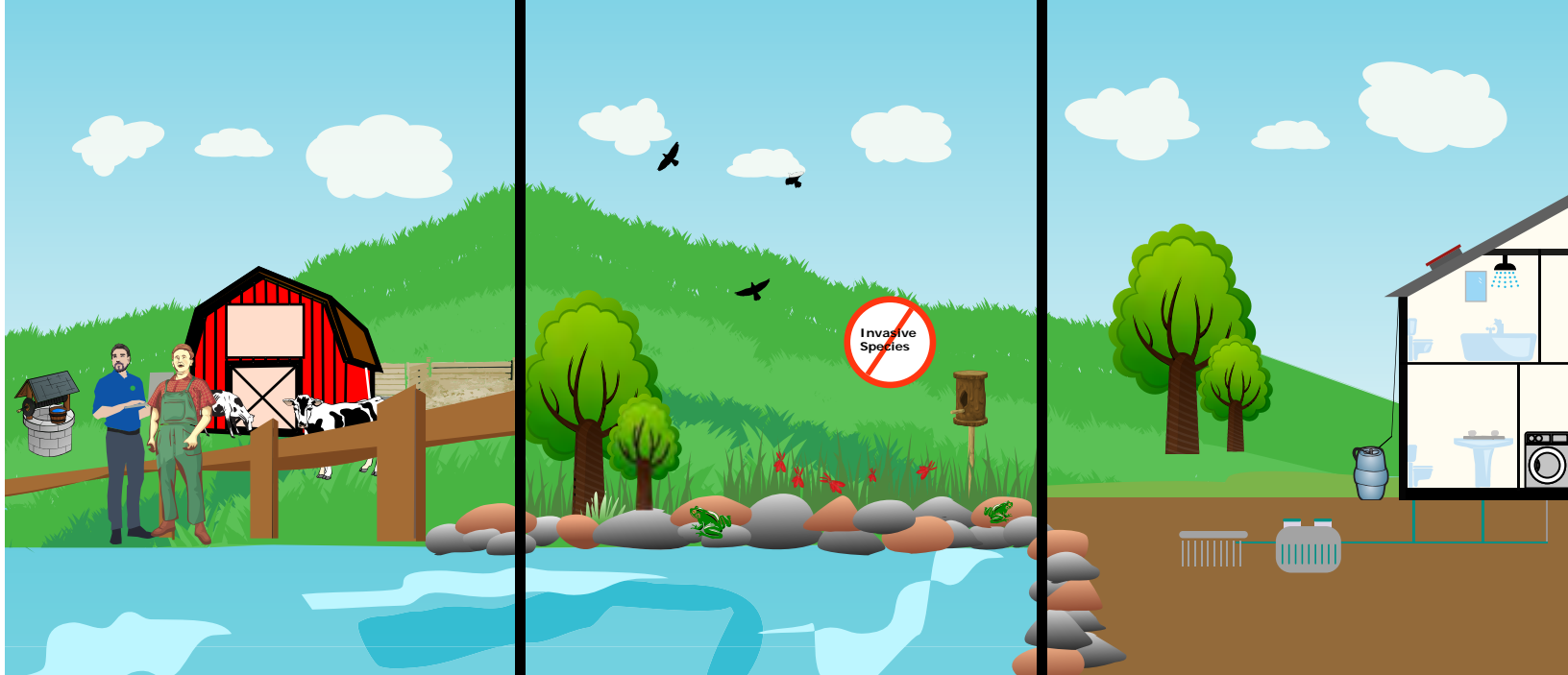
1. Improve water quality and fish habitat by retrofitting dam structures to bottom discharge and removing dams in headwater reaches and tributary streams.
2. Complete river restoration projects including stream-side tree and shrub planting and bank stabilization on the Mad River between Creemore and Avening (Airport Road). The goal of this work is to improve water quality and reduce summer water temperatures in the vicinity of Airport Road.
3. Restore and enhance wetlands in headwater areas, critical groundwater recharge areas and expand swamp forest within the Minesing wetlands.
4. 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, encouraging farm soil health practices, and adopting low impact development techniques in urban areas.
5. Reduce soil erosion and runoff of nutrients (e.g. phosphorus) and fecal bacteria, to protect streams, lakes and groundwater. This can be achieved through agricultural stewardship practices, streambank stabilization and good septic care.

Before (2016)

After (2018)



An example of streambank restoration in the Mad River subwatershed:
Trout stream restoration and bank stabilization in constructed floodway, Black Ash Creek Collingwood.



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 five properties within the Mad River subwatershed totaling 1,218 ha.

County Forests are managed for a variety of environmental, social and economic purposes. there are nine Simcoe and two Grey County Forest tracts totaling 943 ha within the Mad 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 two park areas (350 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 River watershed, including 11 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 approximately 10 km of looped trails that meander through a mixture of wetlands, forests, and open meadows. NVCA manages a portion of the Tiffin Conservation Area on behalf of its partner, Ontario Heritage Trust.

Minesing Wetlands (in this subwatershed)

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!