

Mad 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 Blue Mountains subwatershed, the rivers flow into Georgian Bay. 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?



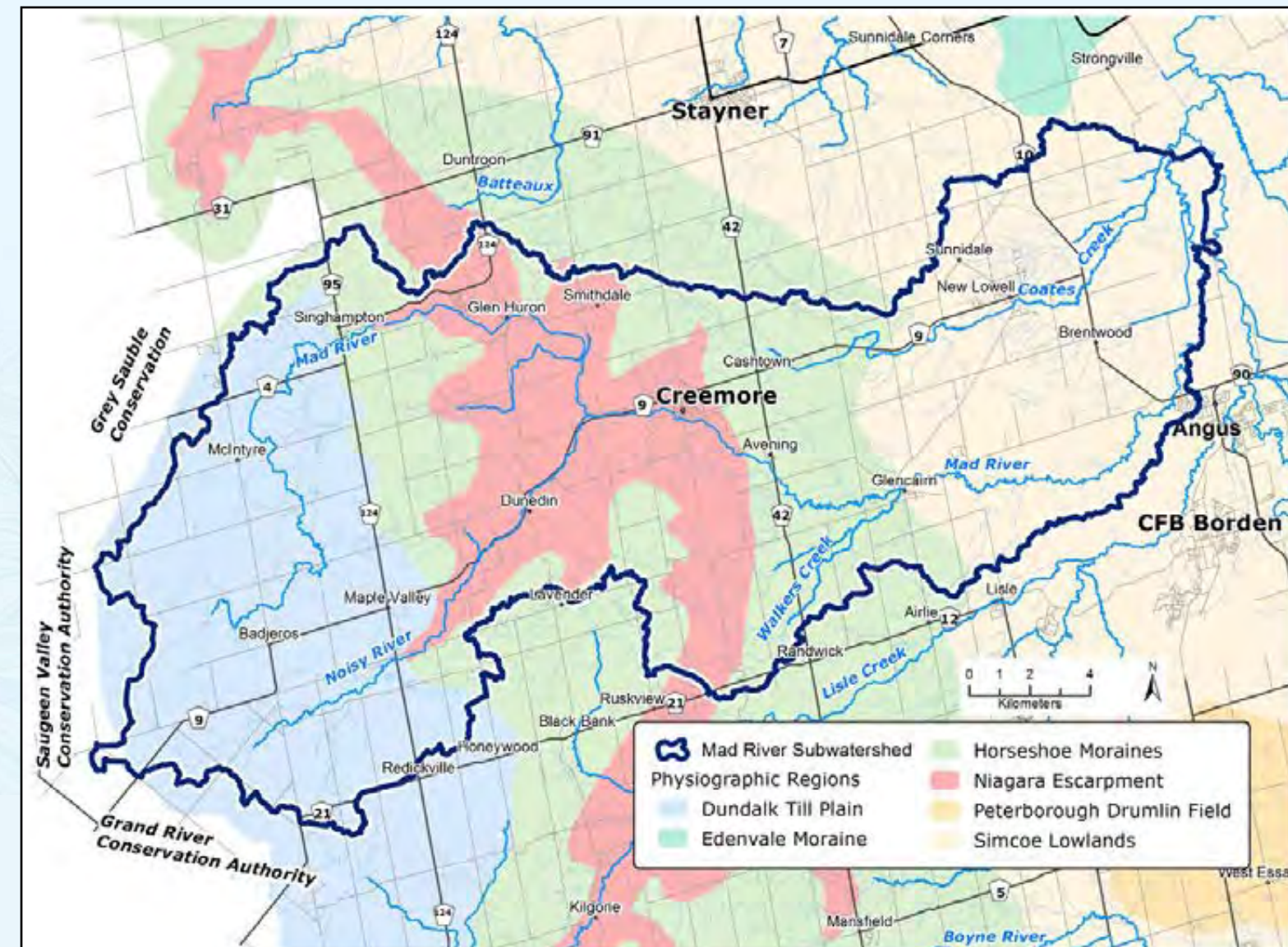
ABOUT THE MAD RIVER SUBWATERSHED

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: Insufficient Data

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 areas) 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.

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.

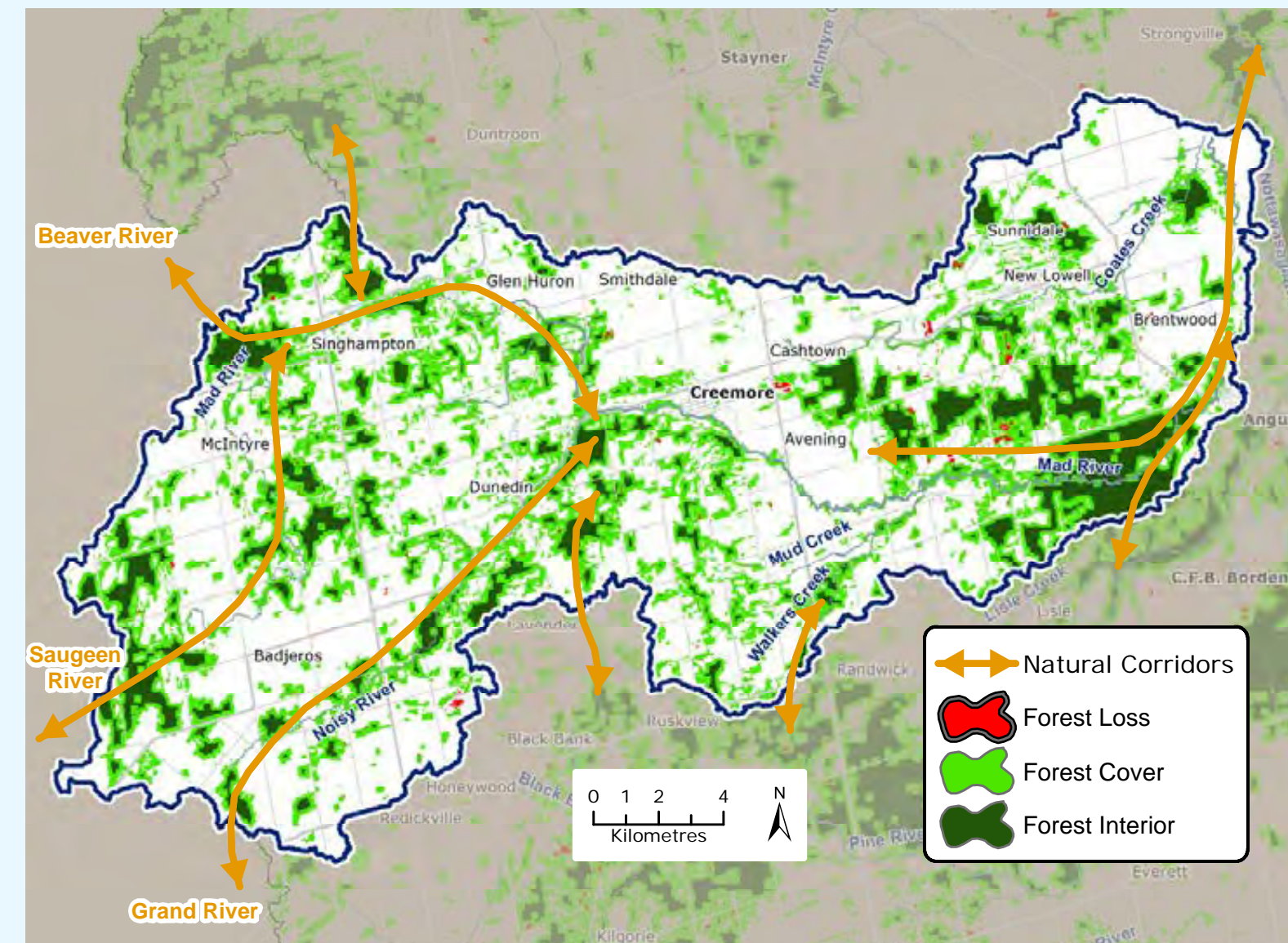
Due to the lack of updated forest cover mapping, Global Forest Change analysis was used showing that there was a loss in subwatershed forest cover of 56 hectares (ha). This method of analysis did not explain the cause of the forest loss or allow for the determination of the amount of forest gain.



Photo of Green Spleen wort, a rare fern species found in the Mad River subwatershed

Indicators	Mad River Subwatershed	NVCA Watershed	Indicator Description
Forest Cover	35.6% (16,105 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	10.5% (4,724 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	50.4% (2,448 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 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 indicates historical wetland loss in the southern part of Clearview Township is 55.4%.

In the Mad River subwatershed, based on satellite photo interpretation, between 2009 and 2016 there was a net subwatershed wetland loss of 38.1 hectares (ha). This represents a 0.5% decrease in wetland cover since 2008. Agricultural conversion and urban development activities resulted in most wetland loss.

Large wetlands are found west of the Niagara Escarpment in the headwaters of the Mad and Noisy Rivers. A mosaic of wetlands are 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 and slowly releasing the water into the Nottawasaga River.

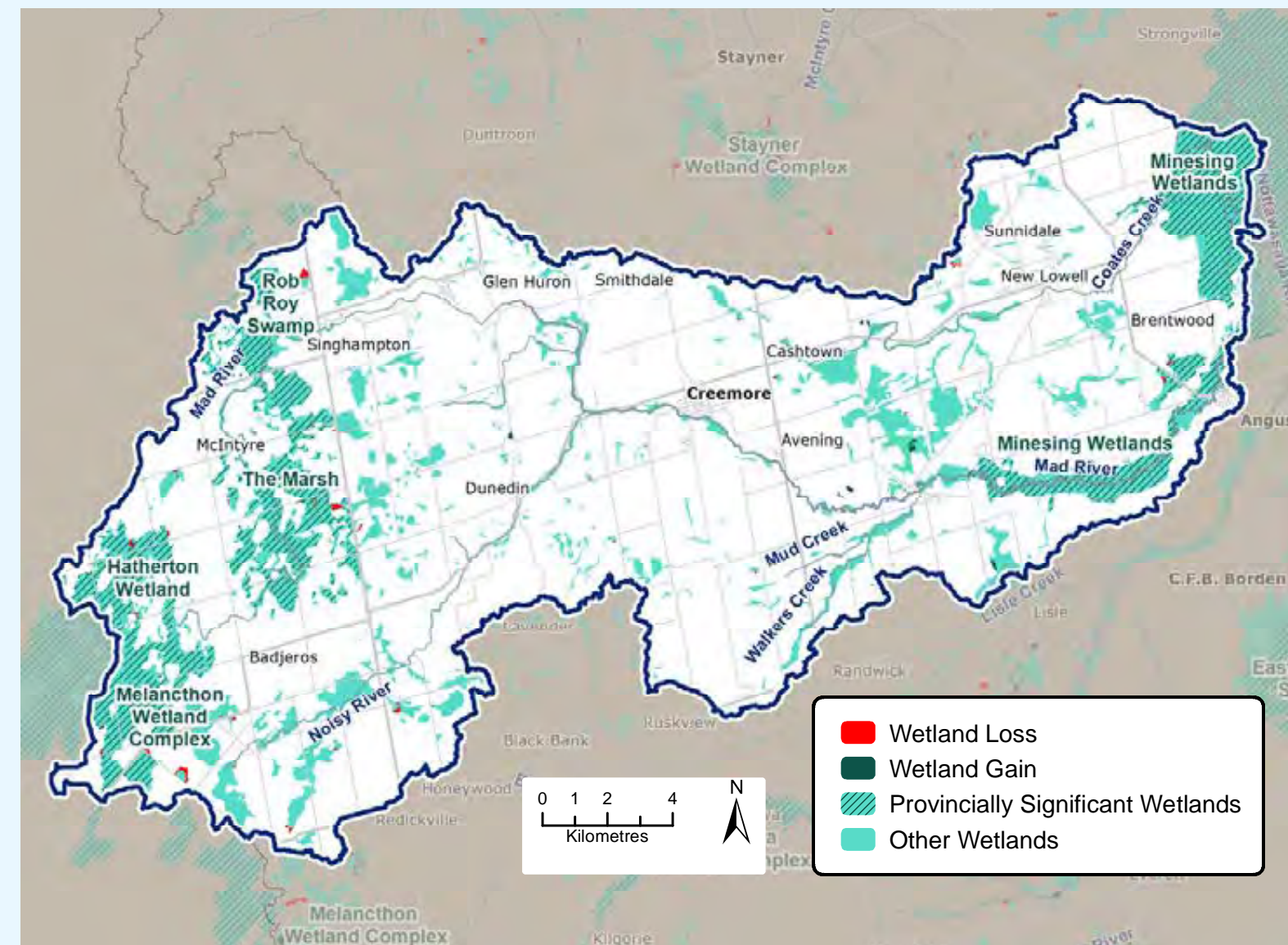
Five groups of wetland in the Mad River subwatershed have been identified as provincially significant by the Ontario Ministry of Natural Resources and Forestry: Melancthon Wetland Complex, Hatherton Wetland Complex, The Marsh, Rob Roy Swamp and parts of the Minesing Wetland Complex. Provincial and municipal planning policies help protect these wetlands from development and site alteration. A number of unevaluated wetlands could be added to the evaluated wetland complexes in this subwatershed. The wetland west of the Escarpment in the headwaters of the Noisy River is unevaluated and could be evaluated to determine its significance.



Photo of Button Bush Thicket Swamp

Indicators	Mad River Subwatershed	NVCA Watershed	Indicator Description	Trend (2009-2016)
Wetland Cover	13.3% (3,946 ha)	14.2%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	Down 97.6 ha
Wetland Buffer (100m buffer area)	36.1% (1,712 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: Fair
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.

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 are graded Below Potential and Unimpaired as they flow through the wetland and rural areas located 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, which provide shade to cool the streams. Stream health improves as these rivers enter the Escarpment. Extensive forest cover and groundwater discharge (springs) through this zone support excellent trout habitat.

East of the Escarpment, stream health declines to Below Potential as the Mad River 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.

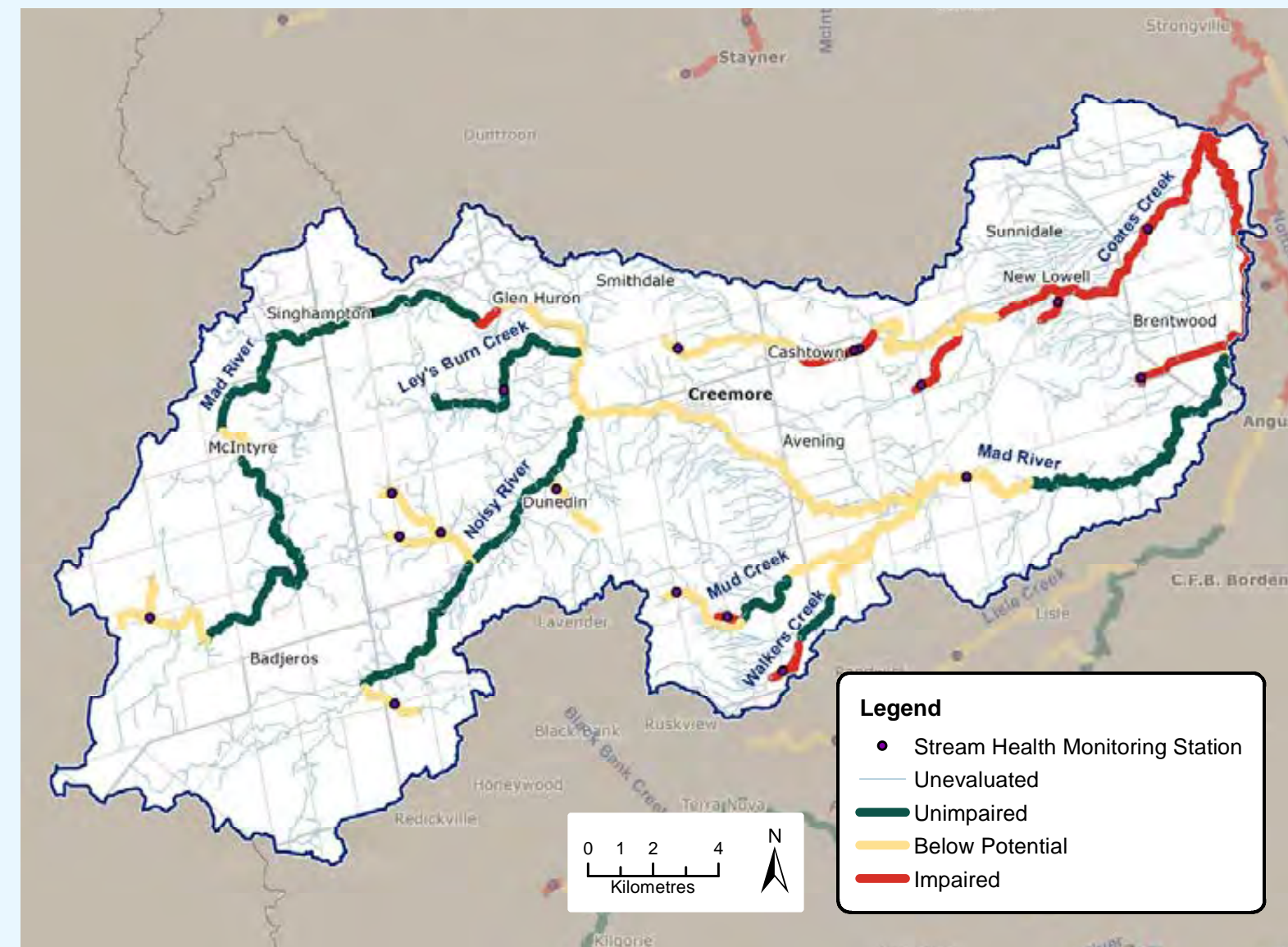
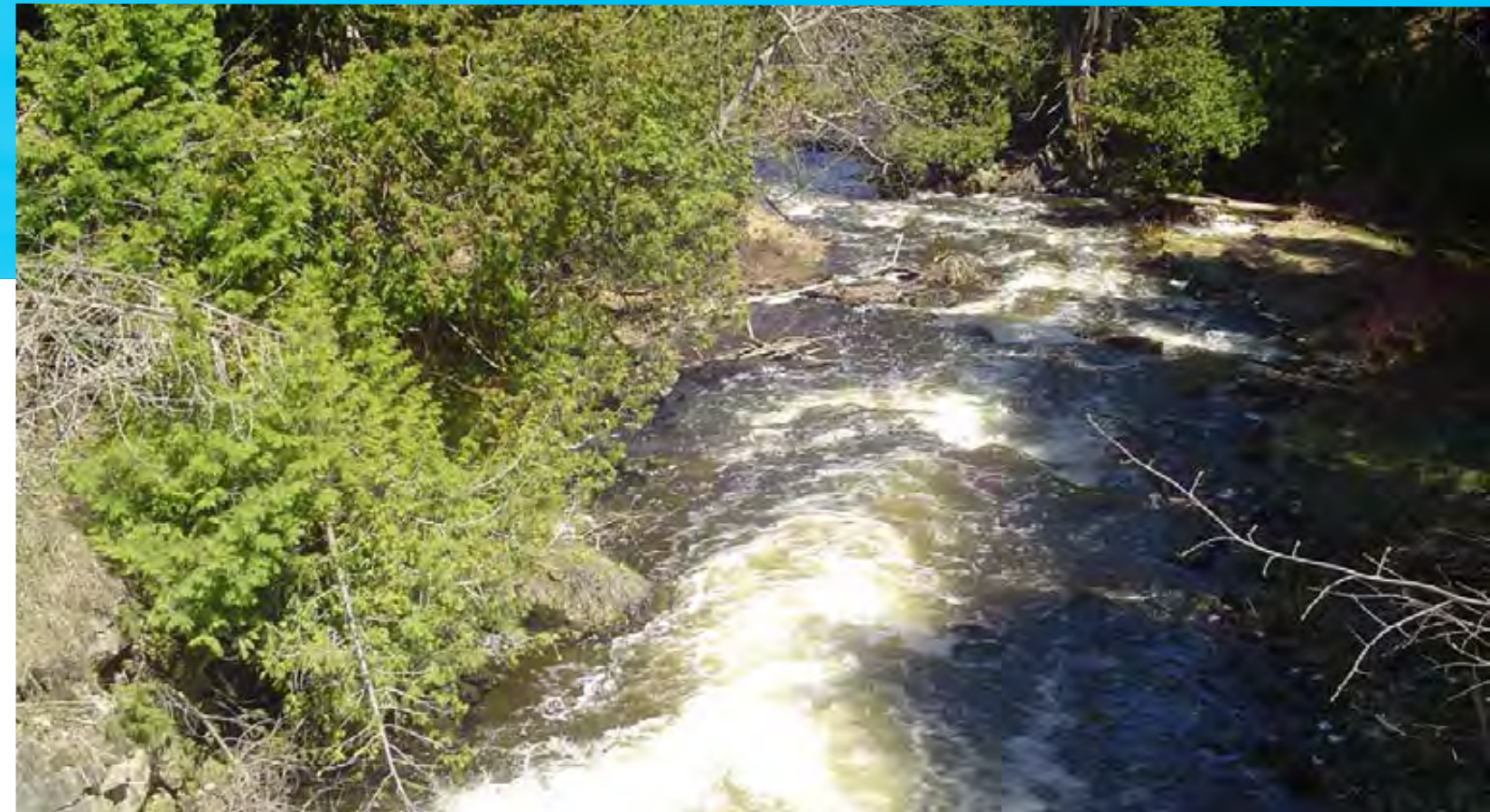
Walkers Creek and Mud Creek are in good health through the Escarpment; however, sparse riparian cover and livestock impacts degrade stream conditions downstream of this zone. Recent cattle fencing along Mud Creek should result in improved stream health over time.

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 declined in the Mad River since the 2013 Health Check. The 2018 Watershed Health Check assessed only 21% of the river length in the Mad River subwatershed, down from 22% in 2013.

Indicators	Mad River Subwatershed	Indicator Description	Indicator Trend (2012-2016)
Benthic Grade	2.17	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
Total Phosphorus (low flow; mg/L)	0.012	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—0.312 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:
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 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 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, the 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 the NVCA to track changes in groundwater levels and quality over time; however, there is insufficient data to evaluate water chemistry.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description
Number of 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 (as nitrogen) 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:



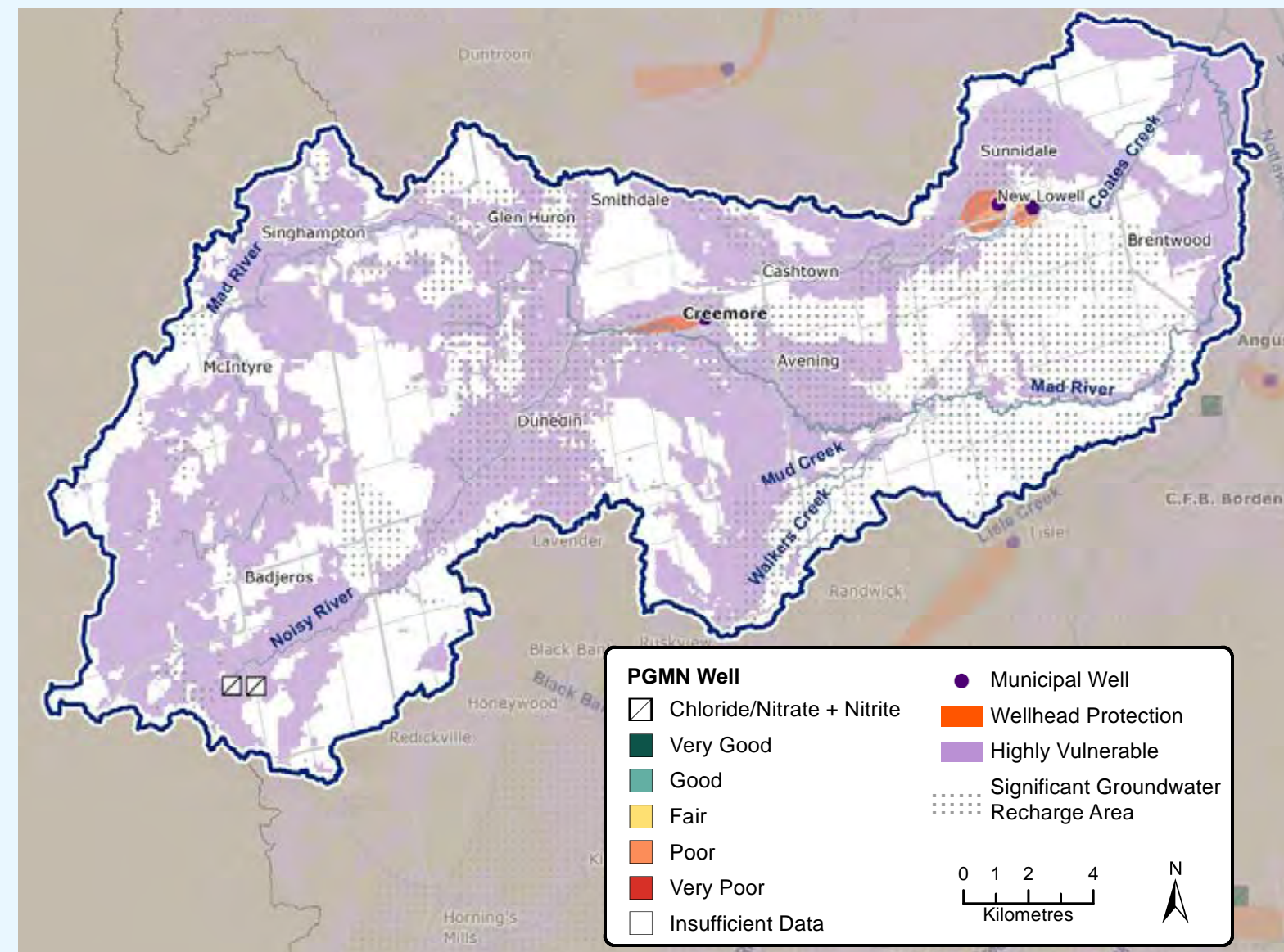
Ontario's Drinking Water Source Protection Program

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 Mad River subwatershed have undertaken 81 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.

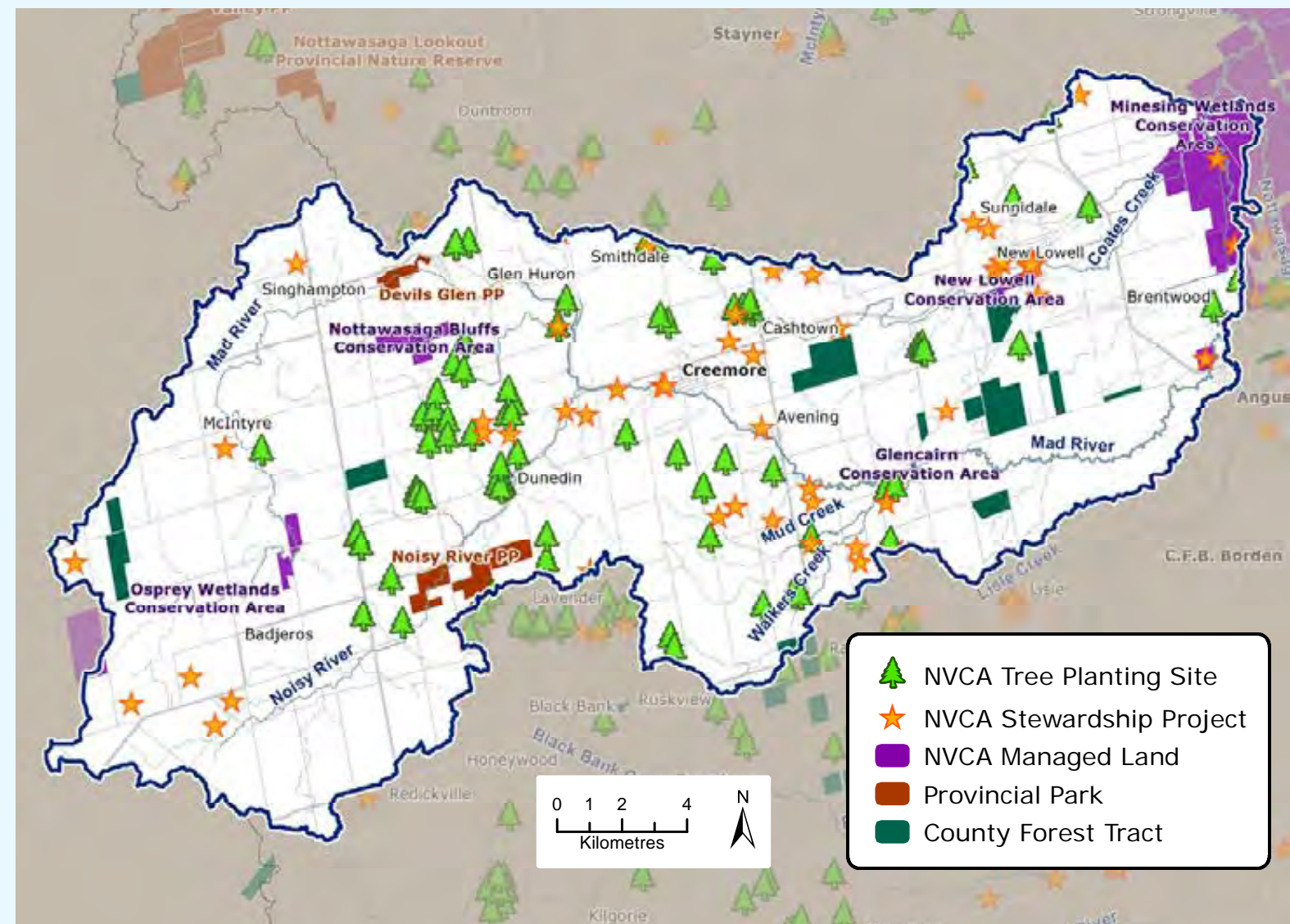
Landowner Grant Assistance

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.

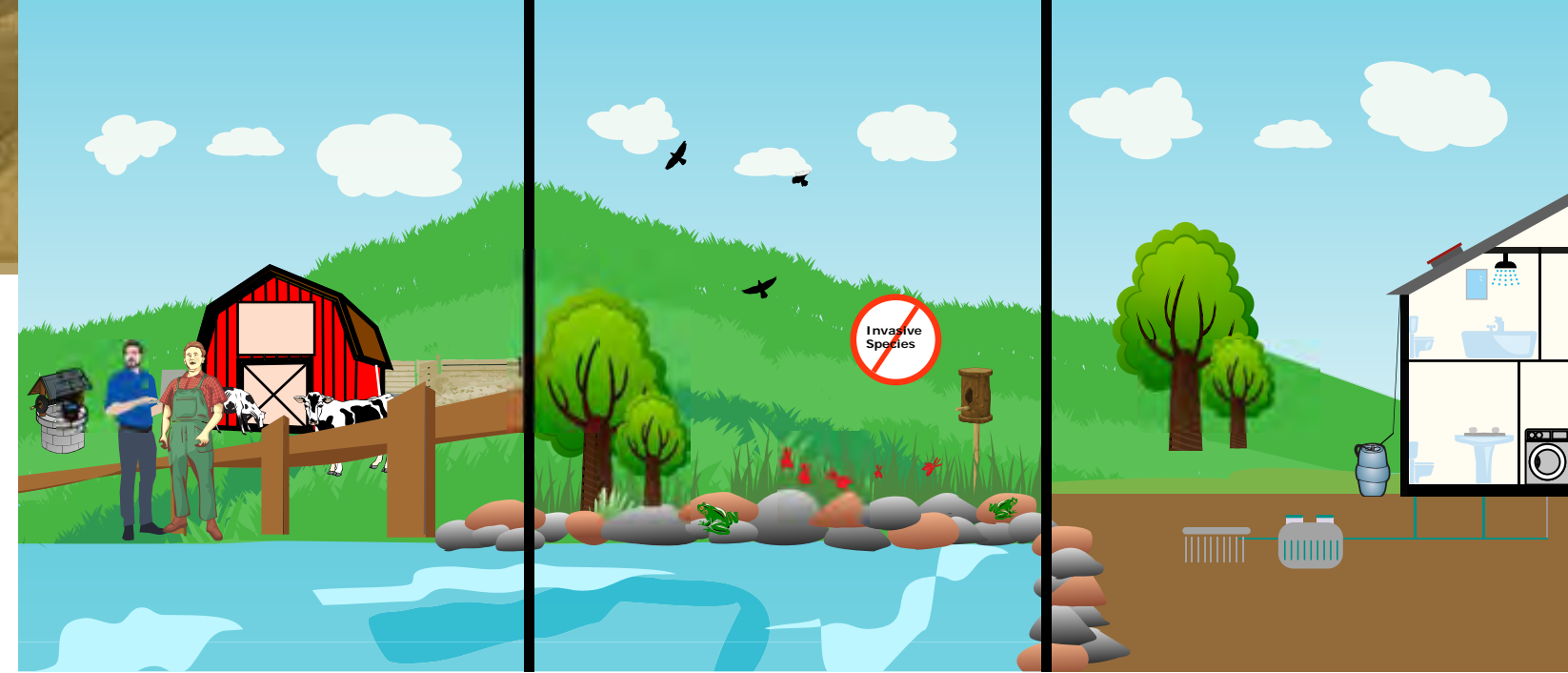
For example the Niagara Escarpment streams to the west are high quality trout streams. Consequently, the restoration priorities within this region align with opportunities to enhance these coldwater habitats as well as address broad water quality improvement objectives. Conversely the lower Nottawasaga 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 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. Improve bank stability and water quality by working with local landowners to plant trees and implement streambank restoration activities between Simcoe Road 9 west of Creemore and the 3rd Line of Tosorontio east of Glencairn.
3. Protect critical flows needed to maintain the Mad River channel and canoe route in the Minesing Wetlands north of the Concession 2 Sunnidale. Monitor the diversion of flow into artificial drains east of the river and complete projects required to address breaches in the banks of the Mad River.
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, and adopting low impact development techniques in urban areas.
5. 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



Brook Trout, an important cold water species in the Nottawasaga Valley Watershed.

High school students braving the elements in plant trees along Coates Creek.

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

County Forests are managed for a variety of environmental, social and economic purposes. there are nine Simcoe, one Dufferin, and one Grey County Forest tracts totaling 969 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 Valley watershed, including 12 conservation areas with opportunities to hike, paddle, and fish. Here are some highlights of our conservation areas (in this sub-watershed?).

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 (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

Nottawasaga Valley Conservation Authority
8195 8th Line, Utopia ON L0M 1T0
T: 705-424-1479 • F: 705-424-2115

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!