

# Boyne 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

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

## WHERE ARE WE?



## ABOUT THE BOYNE RIVER SUBWATERSHED

The Boyne River arises as a series of tributaries from headwater wetlands northwest of Shelburne. Stream sections between wetlands have often been altered to drain agricultural lands. These tributaries flow eastward through a gently rolling headwater landscape, joining to form the main branch of the Boyne River northeast of Shelburne. Upstream of County Road 17, the river enters the Niagara Escarpment (World Biosphere Reserve), cascading through a steep, forested valley system that extends downstream past Airport Road (County Road 18).

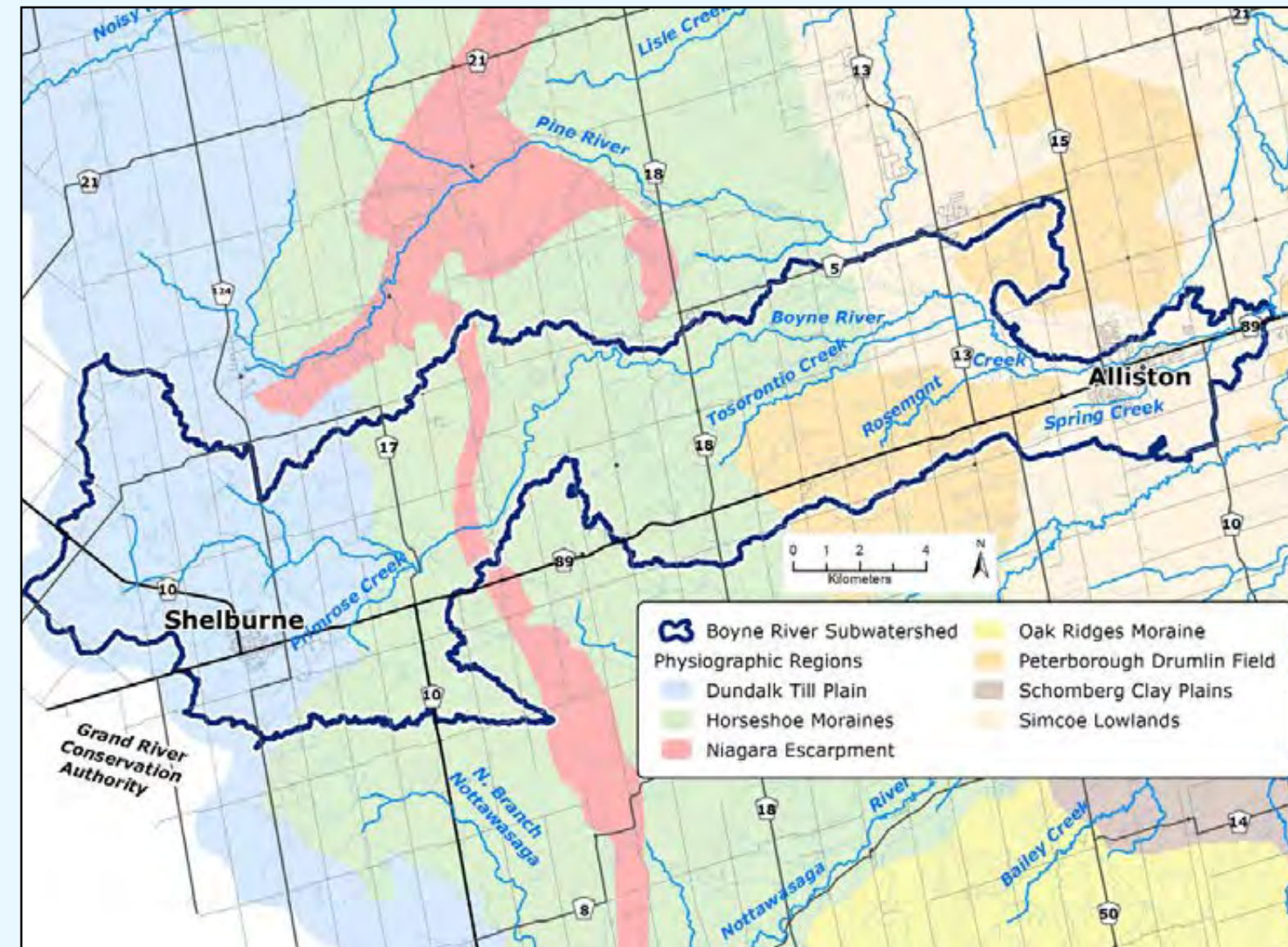
Downstream to Earl Rowe Provincial Park, just west of Alliston, the river flows through a rolling agricultural/rural/aggregate pit landscape before entering the large reservoir at the park. From Earl Rowe Provincial Park downstream to the Nottawasaga River (at Nicolston),

the Boyne River flows eastward through a narrow, variably forested valley that bisects Alliston.

Primrose Creek arises in headwater wetlands east of Shelburne. It flows northward, entering the forested Escarpment zone north of Highway 89 before discharging to the Boyne River.

Tosorontio and Rosemont Creeks arise to the south of the Boyne River near Rosemont. They flow eastward through agricultural lands, discharging to the river upstream of Earl Rowe Provincial Park.

Spring Creek is a small, spring-fed creek that flows eastward along the southern boundary of urban Alliston. It flows through the sandy loams of the Simcoe Lowlands, entering the Boyne River near Nicolston.





# FOREST CONDITIONS

Status: Fair  
Trend: Insufficient Data

Forest cover in the Boyne River subwatershed is sparse compared to other NVCA subwatersheds that span the Niagara Escarpment. Soils and slopes here are better suited to farming than those in the Pine, Mad and Upper Nottawasaga River subwatersheds, which explains the lack of forest cover and interior forest (deep, undisturbed forests). Large forests provide significant habitat for wildlife species that require forest interior habitat to thrive.

Large forests in the Boyne River valley are restricted to the Niagara Escarpment zone. Smaller concentrations of forest are found in the headwaters (river source areas) near Shelburne and valley areas east of the Escarpment.

The escarpment forests in the Boyne River Valley are provincially significant. These forests support a rich mosaic of plant communities, including a number of rare orchids. In turn, the plant communities supports a diverse array of wildlife including rarely sighted species such as River Otter and Fisher. Mixed and conifer forests through the

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

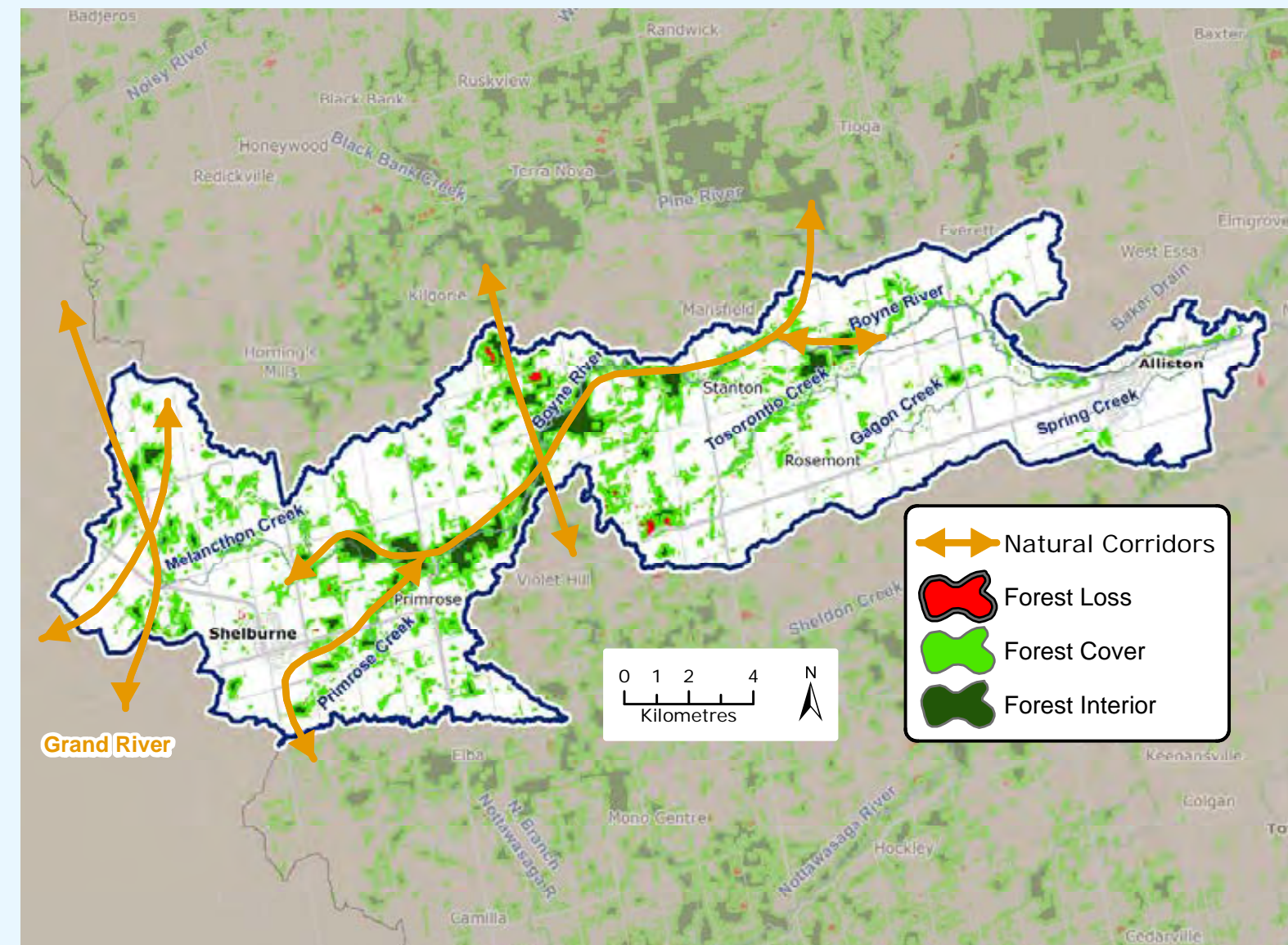
Wetlands are also present in the Boyne River subwatershed. As shown with orange arrows on the map, headwater swamps west of the Escarpment are connected to similar wetland habitats in the Grand River watershed to the west. Escarpment forests and wetlands are linked to the Upper Nottawasaga River subwatershed to the south and Pine River subwatershed to the north. A narrow, fragmented natural corridor along the Boyne River valley extends east through Alliston to the Middle Nottawasaga River watershed.

Due to the lack of updated forest cover mapping, Global Forest Change analysis was used showing that there was a loss of 21 hectares (ha) of forest cover in the Boyne River subwatershed between 2009 and 2016. This method of analysis did not explain the cause of the forest loss or allow for the determination of the amount of forest gain.



Indicators	Boyne River Subwatershed	NVCA Watershed	Indicator Description
Forest Cover	22.8% (5,472 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	4.1% (976 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	40.6% (964 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: Fair  
Trend: Increasing

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 Boyne 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 Boyne River subwatershed meet Environment Canada's wetland habitat guidelines and are considered moderately healthy. However, historical land conversion has resulted in significant wetland loss in this area. Data from Ducks Unlimited Canada data indicate historical wetland loss in the Town of Mono (the largest municipality within the subwatershed) is 54.2%.

In the Boyne River subwatershed, based on satellite photo interpretation, between 2009 and 2016 there was a net subwatershed wetland gain of 1.9 hectares (ha). This represents a 0.3% increase in wetland cover since 2008. Wetland were gained through natural regeneration, while wetland loss was due to agricultural conversion.

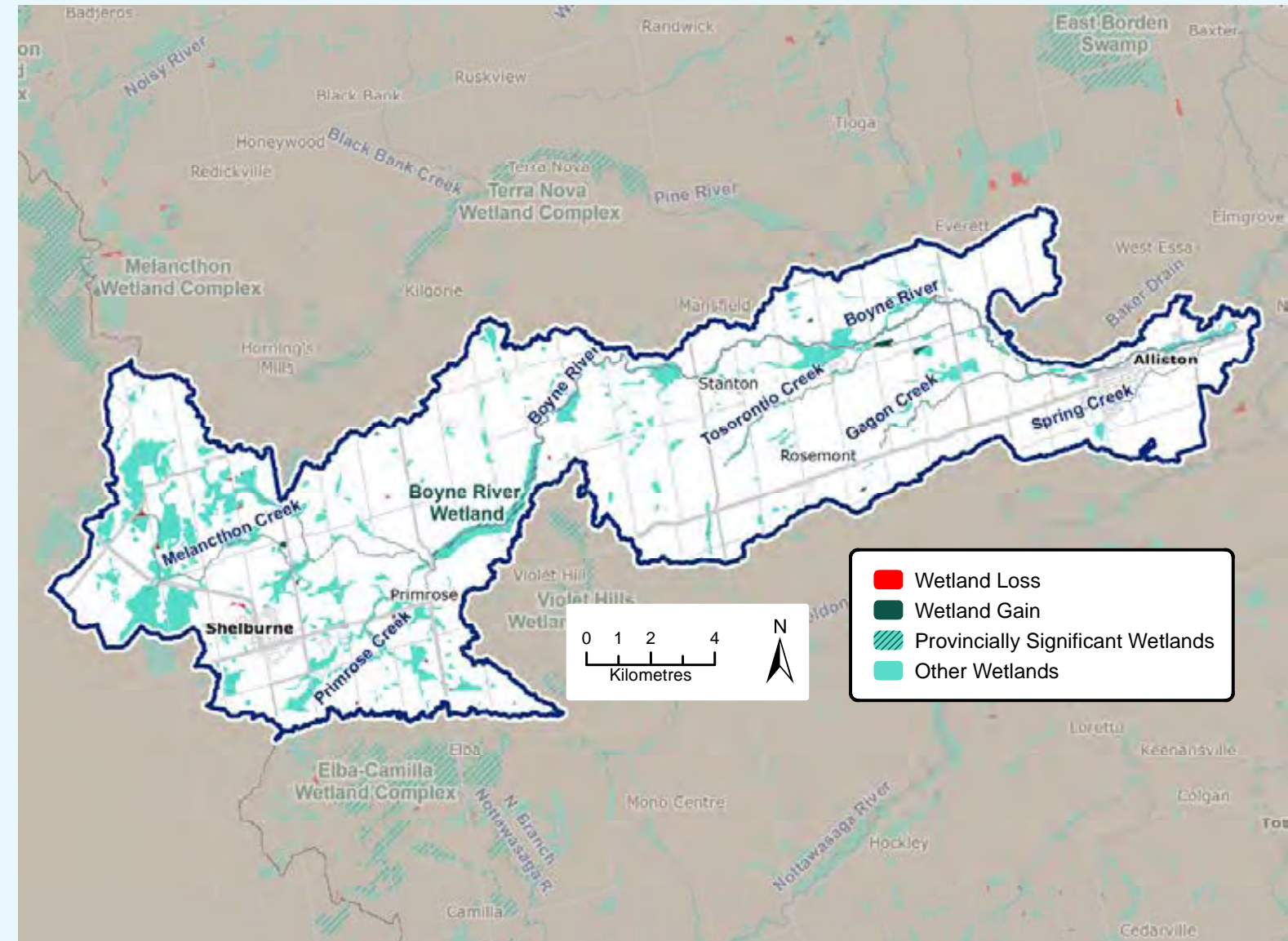
The Boyne headwaters are fed by a group of wetlands. A series of wetlands is also found following the Boyne River valley from the Niagara Escarpment downstream to Alliston. Isolated wetlands are also present along tributary valley systems downstream of the Escarpment.

The Boyne River Wetland Complex has been evaluated as provincially significant by the Ontario Ministry of Natural Resources and Forestry and Forestry. Provincial and municipal planning policies help protect this wetland from development and site alteration. Large unevaluated wetland complexes are present in the Boyne headwaters and could be evaluated to determine their significance.



Indicators	Boyne River Subwatershed	NVCA Watershed	Indicator Description	Trend (2009-2016)
Wetland Cover	11.5% (2,766 ha)	14.2%	10% wetland cover has been identified as a minimum guideline for healthy watersheds (Environment Canada).	Up +1.9 ha
Wetland Buffer (100m buffer area)	31.2% (1,438 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: No Change

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

Stream health in the Boyne River subwatershed covers all assessment categories. The main branch of the Boyne River supports productive trout habitat upstream of the Earl Rowe Provincial Park reservoir (west of Alliston) to Shelburne. Tosorontio Creek and the downstream section of Gagon Creek also support healthy trout populations.

Stream health in the headwaters of the Boyne River exhibit Below Potential to Impaired conditions as they flow through a mosaic of farm fields, online ponds and wetlands. Sparse riparian (streambank) vegetation and agricultural drainage impact stream health in this area. Urban impacts, including stormwater ponds and wastewater treatment plant discharge from Shelburne, also impact the water quality in the headwaters.

Stream health begins to improve as the Boyne River enters the forested wetlands below Shelburne. Fifteen years ago, a stream rehabilitation project involving the removing two online ponds was completed. This has started to show benefits in improved local stream health. Stream health continues to improve as the Boyne River enters the Niagara Escarpment. Extensive forest cover and groundwater discharge (springs) through the Escarpment contribute to this improved stream health.

Below the Escarpment, stream health in the Boyne River continues to be Unimpaired through the Boyne River Provincial Park. As the Boyne River enters the Simcoe Lowlands, stream health becomes Below Potential due to tributary nutrient loadings, river channel alterations and gravel pits. As the Boyne River flows into the Earl Rowe reservoir, water temperature rises significantly, limiting trout habitat. Pollutants from urban areas in Alliston also impact the Boyne River.

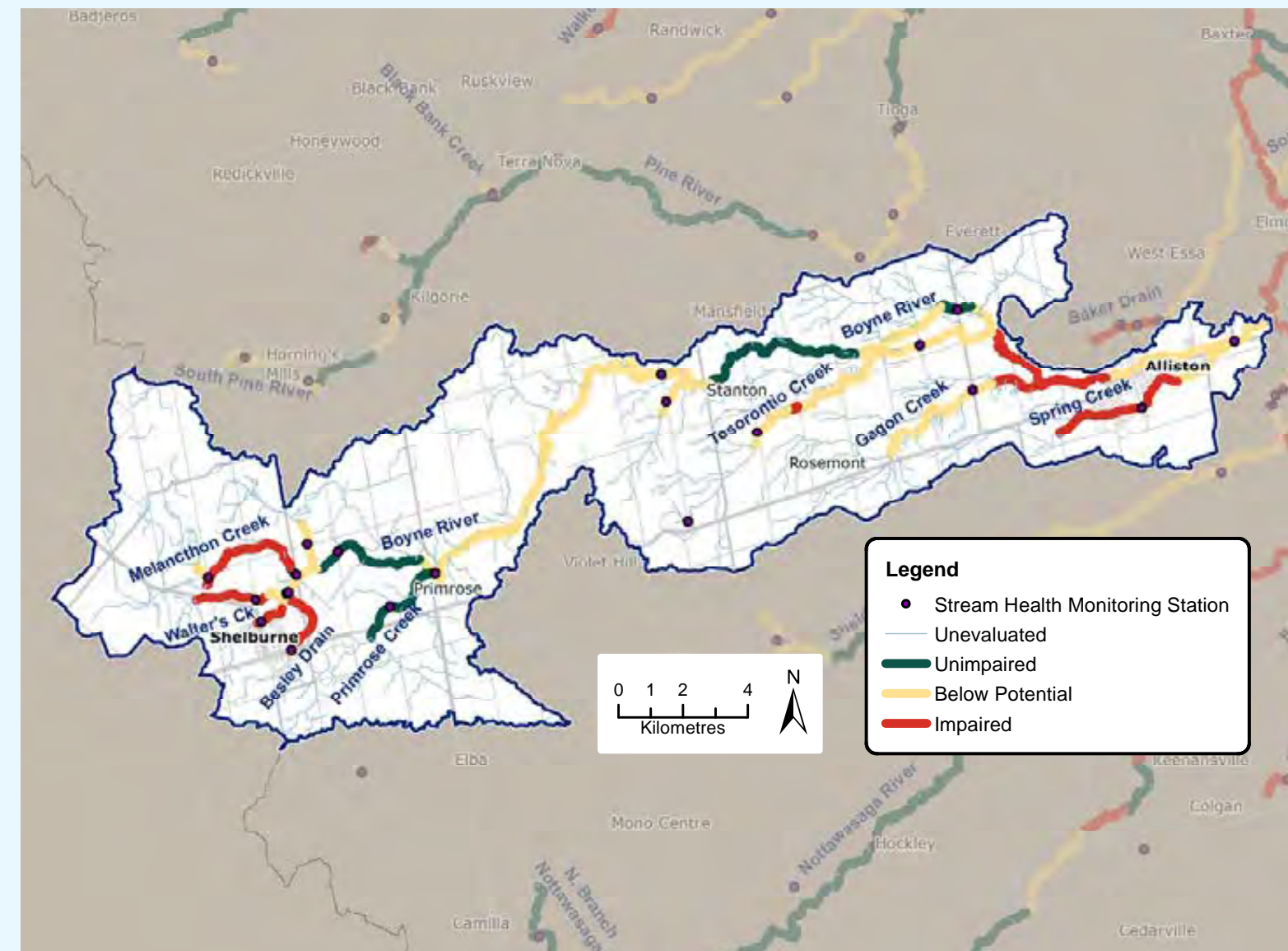
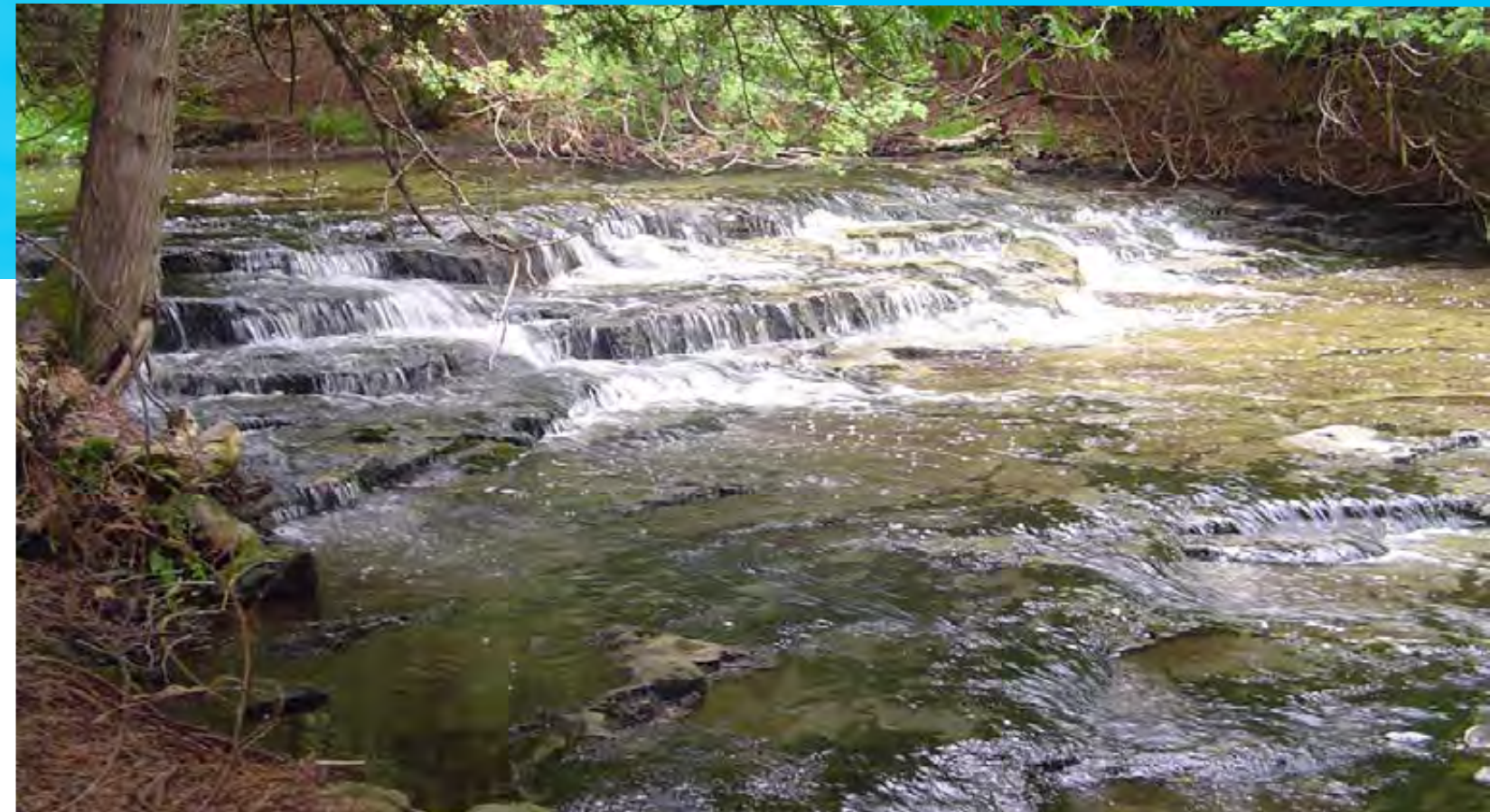
The headwaters of Tosorontio Creek have previously been found to be Unimpaired and support brook trout (an important native species) in past Watershed Health Checks, but this part of the creek was not assessed in this version of the Health Checks. Downstream, sparse riparian vegetation, cattle access and online ponds contribute to a decline in stream health. Stream health in Gagon Creek fluctuates between Below Potential and Impaired due to rural/agricultural impacts. Historically, Spring Creek has been considered to be Impaired through Alliston; however, past efforts by industry to reduce their impacts have been successful and its health is now Below Potential as it enters the Boyne River.

East of Alliston, phosphorus levels in the Boyne River are moderate during low flow conditions. This is likely due to urban inputs and wastewater treatment plant discharge – but remains below provincial phosphorus objectives.

Overall, stream health has remained unchanged since the 2013 Health Check. The 2018 Watershed Health Check assessed 24% of the river length in the Boyne River subwatershed, down from 28% in 2013.

Indicators	Boyne River Subwatershed	Indicator Description	Indicator Trend (2012-2016)
Benthic Grade	1.92	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)	0.019	Total phosphorus indicates nutrient levels within a stream. Our healthiest streams have levels less than 0.01 mg/L during low flow conditions. Boyne River range in all conditions: 0.002—0.090 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:  
No data collected

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 Boyne River subwatershed, there are ten 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.

There are currently no PGMN wells within the Boyne River subwatershed. The NVCA continues to work with the Province and member municipalities to improve the PGMN coverage where feasible.

Indicators	Shallow Wells (0-20m)	Intermediate Wells (21-60 m)	Deep Wells (>60m)	Indicator Description
Number of wells	0	0	0	
Chloride (mg/L)	No Data	No Data	No Data	The Ontario guideline for chlorides in drinking water is 250 mg/L and is based on aesthetic objectives. Drinking water should not exceed this level.
Nitrite & Nitrate (mg/L)	No Data	No Data	No Data	The Ontario standard for nitrite and nitrate is 10 mg/L and is based on the maximum allowable concentration. Drinking water should not exceed this level.

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

Rating Scale:



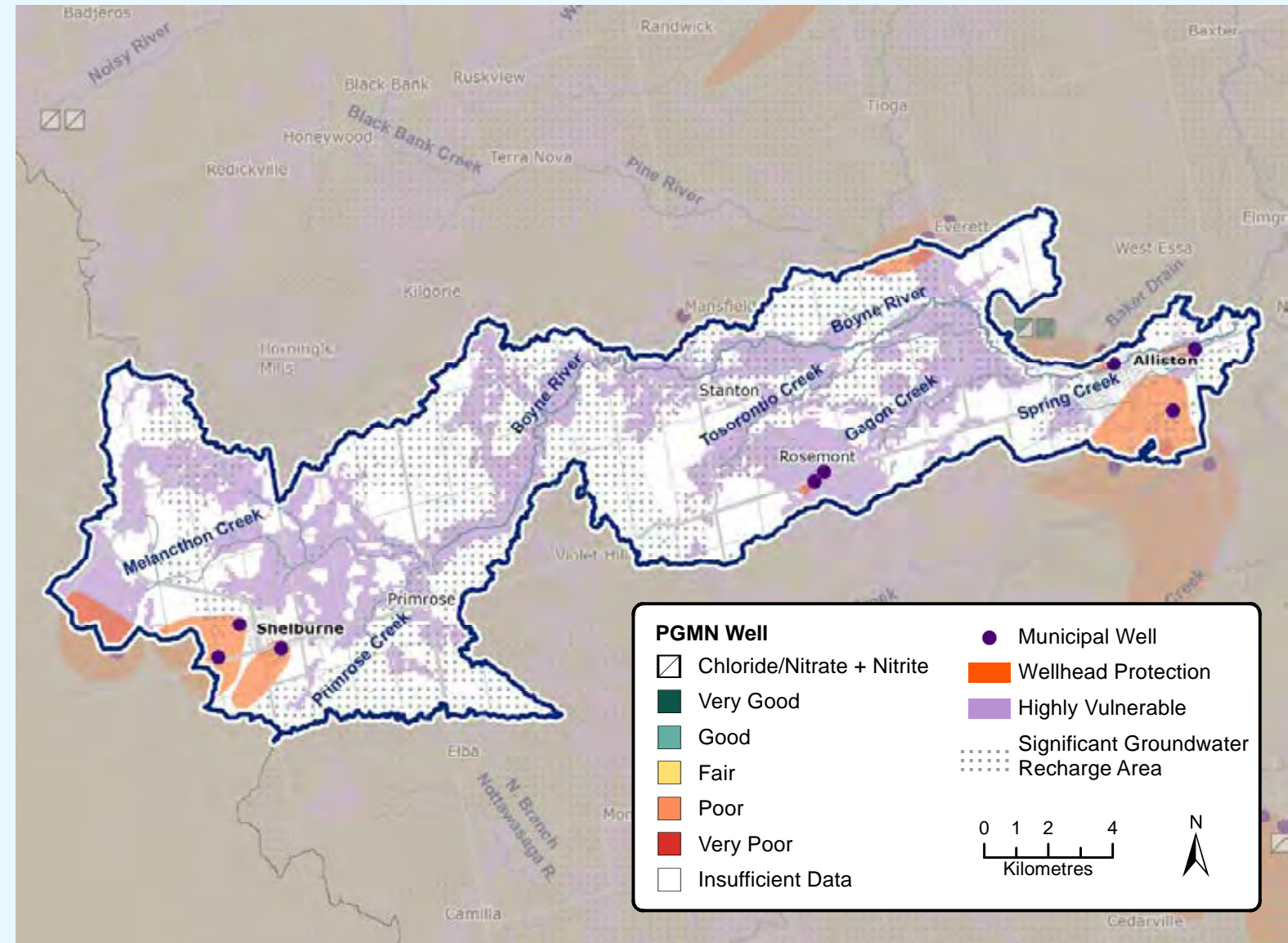
## Ontario's Drinking Water Source Protection Program

Focuses on protecting municipal drinking water sources, including:

**Wellhead Protection Areas** areas that contribute water to municipal wells,

**Highly Vulnerable Aquifers** areas where groundwater is close to ground surface

**Significant Groundwater Recharge Areas** areas which feed the aquifers.





# WATERSHED STEWARDSHIP



## What is Watershed Stewardship?

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

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

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



## Forestry Program

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

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 Boyne River subwatershed have undertaken 83 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.

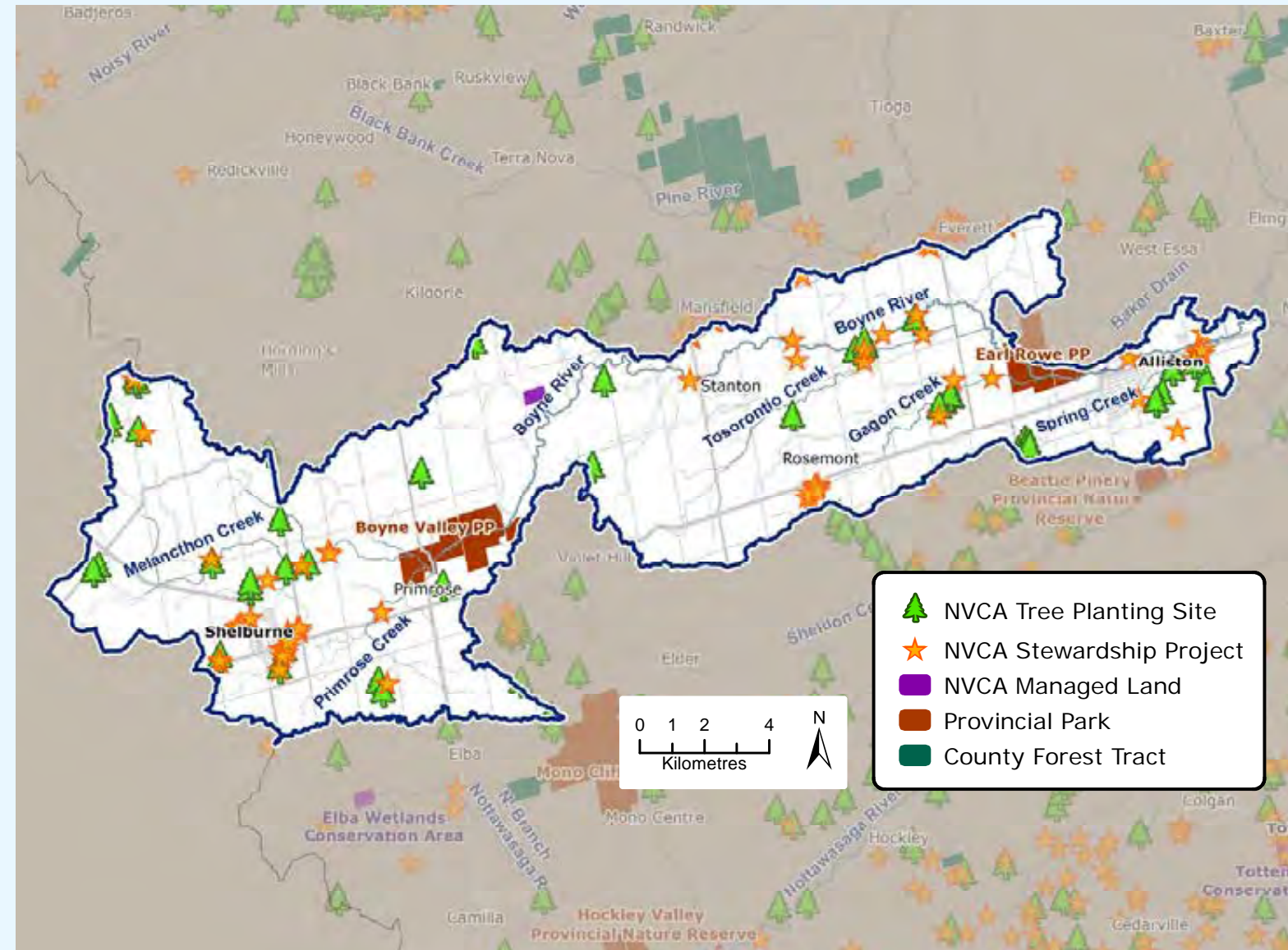
## Landowner Grant Assistance

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.

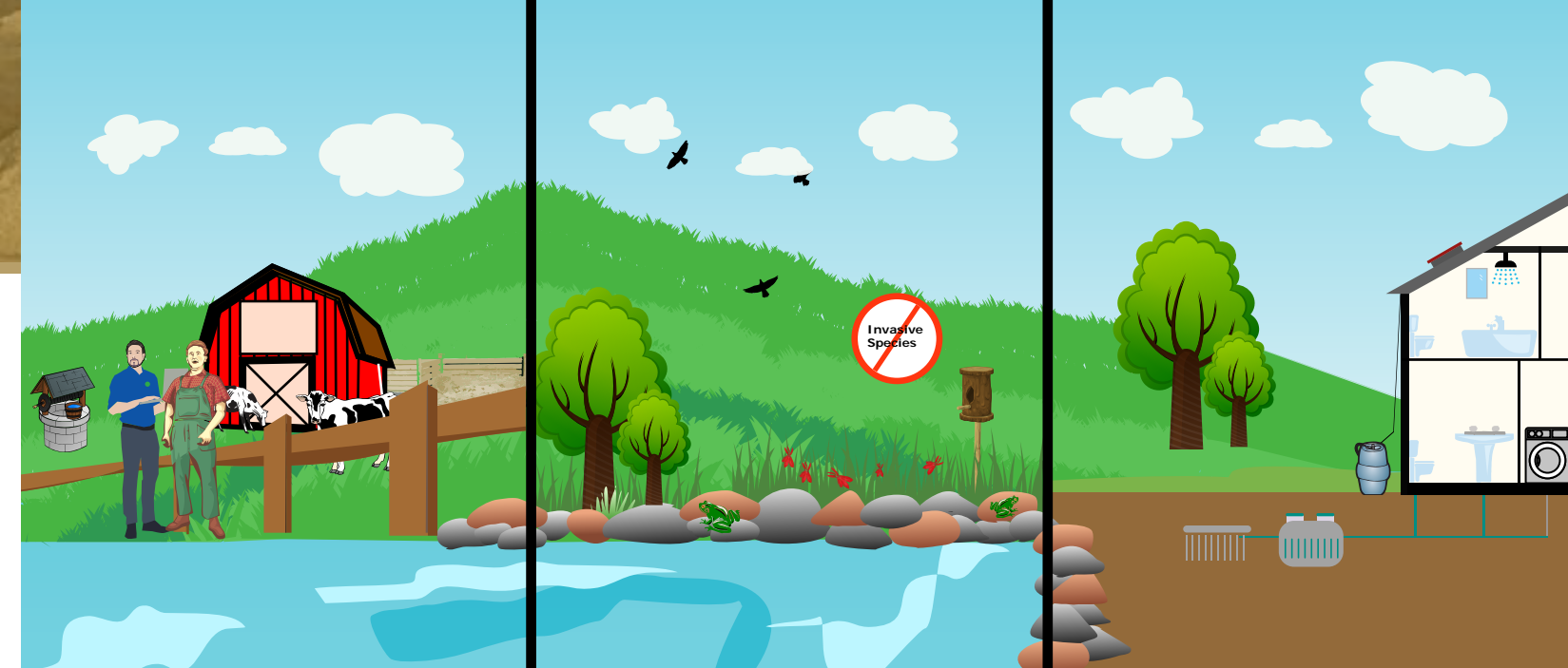
For example the Niagara Escarpment streams to the west are high quality trout streams. Consequently, the restoration priorities within this region align with opportunities to enhance these coldwater habitats as well as address broad water quality improvement objectives. Conversely the lower Nottawasaga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

1. Improve bank stability and water quality by completing stream-side tree planting, habitat friendly bank stabilization activities and installation of livestock exclusion fencing on the Boyne River between the 7th Line EHS, Mulmur and 6th Line North Adjala Tosorontio.
2. Improve water quality and fish habitat by retrofitting dam structures to bottom discharge and removing dams in headwater reaches and tributary streams.
3. Support the construction of effective urban stormwater management systems in Shelburne and Alliston designed to protect coldwater trout habitat in the Boyne 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

### Before (Summer 2003)



### After (Summer 2004)



**An example of streambank restoration in the Boyne River subwatershed:**  
Example of historic dam removal project on the Boyne River designed to provide for fish passage and improve water quality.

## 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](http://www.nvca.on.ca).



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

## PUBLIC LANDS MANAGEMENT

NVCA's land acquisition program focuses on strategic land securement for the long-term protection of natural features and functions. These properties also provide valuable recreational opportunities to watershed residents. The NVCA manages two properties within the Boyne River subwatershed totaling 39 hectares (ha).

County Forests there are no County Forest properties in the Boyne 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 (626 ha) within this subwatershed.

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

## IMPROVE YOUR ECOHEALTH IN OUR CONSERVATION AREAS

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

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

### Tiffin Centre for Conservation

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

### Minesing Wetlands

Minesing Wetlands acts as an important natural flood control reservoir. During periods of high water levels, the wetland fills up with water and slowly releases it into 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.

### Boyne Valley Springs (in this subwatershed)

Boyne Valley Springs is one of the properties NVCA manages within the Boyne River Subwatershed. The Bruce Trail transects the property through rolling hills and mature forests.

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](http://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!