



Surface Water Quality  
**D - Steady**

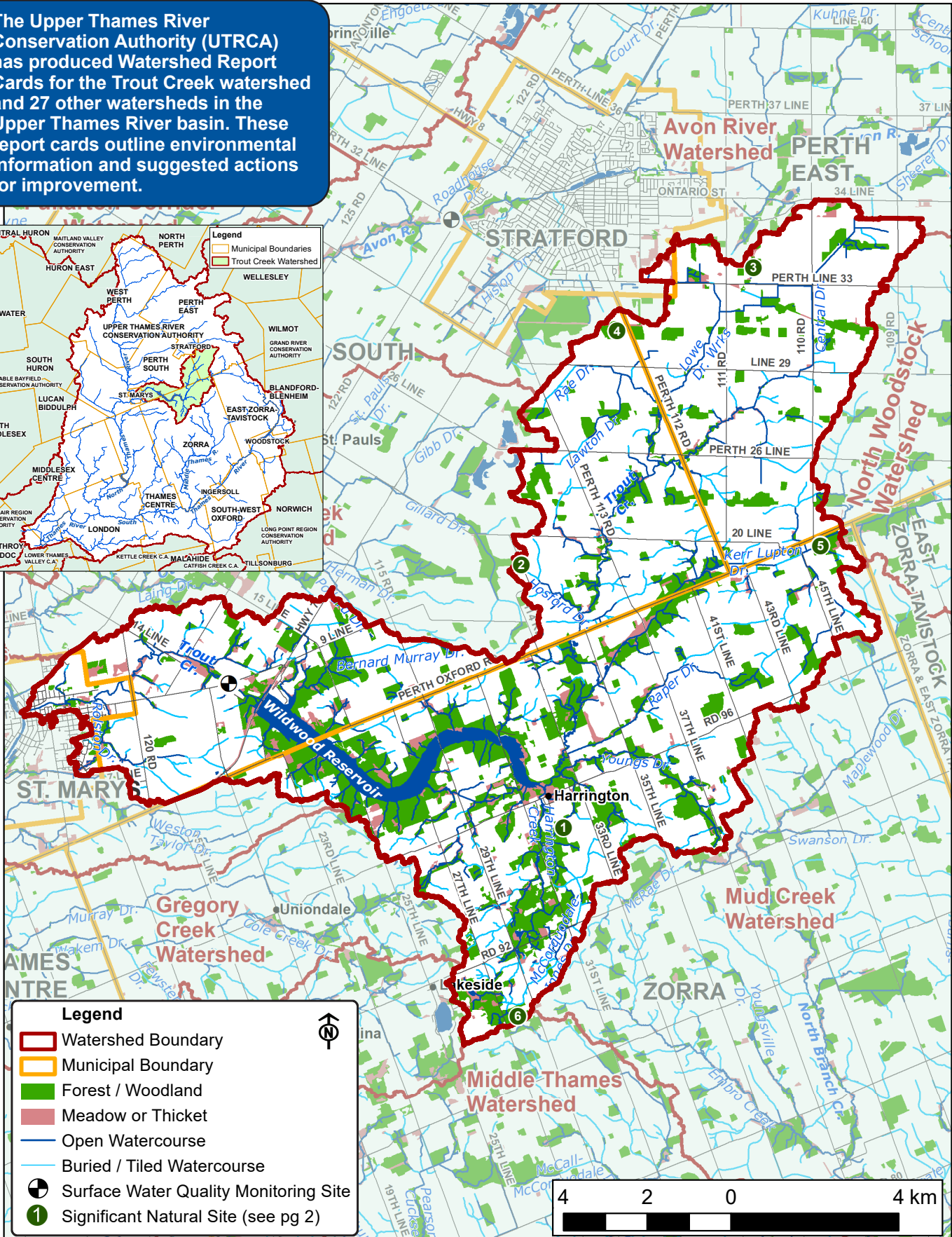


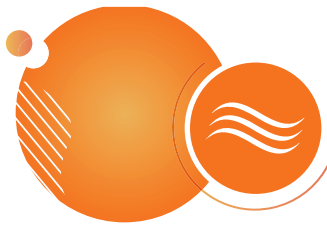
Forest Conditions  
**C - Slight Improvement**

2022 Watershed Report Card

# Trout Creek

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Trout Creek watershed and 27 other watersheds in the Upper Thames River basin. These report cards outline environmental information and suggested actions for improvement.





# Watershed Features

Feature	Description														
Municipalities	Zorra (44%, 70 km <sup>2</sup> ), Perth South (33%, 52 km <sup>2</sup> ), Perth East (21%, 34 km <sup>2</sup> ), St. Marys (2%, 3 km <sup>2</sup> ), Stratford (< 1%, < 1 km <sup>2</sup> ). Total Area: 15,933 ha (162 km <sup>2</sup> ), 5% of the Upper Thames River watershed.														
Significant Natural Sites	Significant Wetlands: (1) Lakeside/Wildwood Complex, (2) Gillard Drain Wetlands, (3) Little Lakes Swamp. Other Wetlands: (4) Stratford Wetland Complex, (5) Zorra Swamp. Life Science Areas of Natural and Scientific Interest (ANSI): (6) Lakeside Swamp. Earth Science ANSI: Broksdale Glacial Complex, Wildwood Silts, Harmony Road Cut. Other: Lakeside Moraine (Harrington Highlands).														
Land Cover	70% agriculture, 22% natural vegetation, 1% open space, 5% built-up/urban, 1 aggregates, 2% water. There has been little change from five years ago. 3% impervious cover (e.g., hard surfaces such as roofs and roads).														
Population	3,391 in 2021; an 8% decrease since 2015 but this may be partly due to watershed boundary corrections.														
Soil Type	43% silty loam, 33% clay loam, 10% sandy loam, 7% bottomland, 4% organic, 3% loam, 2% not mapped (urban)														
Physiography	54% undrumlinized till plain, 16% spillway, 14% drumlinized till plain, 7% till moraine, 6% eskers, 1% clay plain, 1% water														
Soil Erosion/ Delivery	16% highly erodible (lands that could potentially contribute > 7 tonnes/ha/yr of soil to a watercourse). The average for the Upper Thames River watershed is 9%.														
Tiling and Drainage	48% of the watershed has agricultural field tile (10% random + 38% systematic), 5% urban drainage, 47% no tiling. An additional 3% of the watershed is tiled/drained compared to five years ago.														
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	348 km of watercourses 38% natural, 30% channelized, 32% buried/closed 20% cool/coldwater, 80% warmwater/unconfirmed 0.22% slope (flat) on Trout Creek, 0.65% slope (steep) on Harrington Creek above Mill Pond. The range is 0.09-1.26% in Upper Thames River watershed													
Dams and Barriers	29 barriers to fish passage have been recorded including the Wildwood Dam, Harrington Conservation Area Dam, and the Wildwood Ducks Unlimited Berm. The St. Marys Weir on the North Thames backs up water into Trout Creek. Other barriers include stormwater ponds, perched culverts, and beaver dams.														
Spills	<table><tr><td>2001-2005</td><td>2006-2010</td><td>2011-2015</td><td>2016-2020</td></tr><tr><td>3</td><td>7</td><td>5</td><td>5</td></tr></table>				2001-2005	2006-2010	2011-2015	2016-2020	3	7	5	5	Recent reported spills involved fuels, industrial chemicals, and manure.		
2001-2005	2006-2010	2011-2015	2016-2020												
3	7	5	5												
Sewage Treatment	There are no sewage treatment plants discharging into Trout Creek. Most homes in the St. Marys portion of this watershed are serviced by the St. Marys Wastewater Treatment Plant which discharges treated effluent to the North Thames River. Rural residences are serviced by private septic systems.														
% Vegetation Cover and Types	Vegetation cover: Composition:	3,332 ha or 20.9% of the watershed 47% deciduous forest, 16% mixed forest, 21% plantation/coniferous forest, 12% meadow, 3% thicket													
Wetland Cover	7.3% (1,163 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 2 ha of wetland cover were lost between 2010 and 2015.														
Woodlot or Patch Size	Size Category		Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)								
	Small (< 10 ha)		180	2	442	16	362								
	Medium (10-30 ha)		31	17	514	18									
	Large (> 30 ha)		22	84	1852	66									
Fish and Mussels	Fish Species: 41 including a historic record (N Brook Lamprey). Gamefish: Smallmouth and Largemouth Bass, Brook Trout, and Yellow Perch. Mussels: 2.														
Species-at-Risk	Birds: 13 species including Bobolink and Piping Plover. Fish: 3 including Northern Sunfish and Silver Shiner. Reptiles: Eastern Ribbonsnake, Midland Painted Turtle, and Snapping Turtle. Plants: Butternut.														

For more information on watershed features and how they compare to the other 27 subwatersheds, see the tables in the full report: 2022 Upper Thames River Watershed Report Cards at [www.thamesriver.on.ca](http://www.thamesriver.on.ca).



# Surface Water Quality

Surface water quality in Trout Creek has remained steady since the last report card and scores an overall grade of D. The water quality monitoring site is downstream of Wildwood Dam (see map). The UTRCA has a water quality target of a C grade for Trout Creek by 2037.

Phosphorus levels score a D and have remained steady. The levels are lower at the monitoring site downstream of Wildwood reservoir compared to an upstream Trout Creek site on 33rd Line.

Fecal bacteria (*E.coli*) levels in Trout Creek have had an increasing trend in past decades but, in recent years, have shown improvement to levels below the Upper

Thames River average. *E. coli* levels are much lower at the monitoring site downstream of Wildwood reservoir compared to levels at the upstream Trout Creek site on 33rd Line.

Nitrate levels (from sources such as fertilizer and waste) have shown improvement since 2000 and are now close to the provincial guideline for aquatic life. Chloride levels (mainly from road salt) have been low over the long term at both Trout Creek monitoring stations, and well below the aquatic life guidelines.

Stream health, as indicated by benthic sampling, showed a decline in this reporting period after a slight improvement during the previous reporting period.

Indicators	Trout Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
<b>Phosphorus (mg/l) *</b>	0.088 D	0.091 D	0.093 D	0.103 D	<b>0.118 D Steady</b>	0.110 D	0.030 B Aquatic Life	Phosphorus is found in products such as fertilizer, detergents, and waste, and contributes to excess algae and low oxygen in streams and lakes.
<b>Bacteria (CFU <i>E. coli</i> 100 ml) **</b>	173 C	478 D	300 C	258 C	<b>186 C Improved</b>	211 C	200 C Recreation	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste. <i>E. coli</i> is a strong indicator of the potential to have other disease-causing organisms in the water.
<b>Benthic Score (FBI)</b>	6.65 F	6.76 F	6.17 D	5.92 D	<b>6.24 D Declined</b>	5.99 D	< 5.00 B Target Only	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.

\*75th percentile, MECP Provincial Water Quality Monitoring Network data. \*\*Geometric mean, Health Unit data. Province-wide grading system used (see page 8). In 2019, the Provincial Recreational Guideline for *E. coli* changed from 100 Colony Forming Units *E. coli* / 100 ml to 200 CFU *E. coli* / 100 ml.

Found in the Trout Creek watershed, Brook Trout are the only trout native to much of the eastern United States/Canada. They require cold, clear, well-oxygenated water. They have a narrow temperature range in which they can live/reproduce, and are particularly threatened by climate change.



Extreme flooding in February 2018 in St. Marys, Ontario.

## Climate Change

Climate change continues to be a critical issue. Locally, storms and floods are becoming more intense and frequent, which affects water quality by increasing runoff and erosion. Flooding and increased temperatures also stress native plant and animal species. Many local municipalities and industries are enacting Climate Action Plans that focus on reducing greenhouse gases and developing adaptation strategies, including nature-based solutions. Increasing natural cover (trees, wetlands, and forests) and green cover (agricultural cover crops) will absorb carbon and improve resiliency to climate change impacts.





## 2022 Watershed Report Card

# Forest Conditions

Forest conditions in the Trout Creek watershed have improved slightly since the last report card and score an overall grade of C. It should be noted that some of the change is due to improved mapping methods and boundary corrections.

The percent forest cover (17.6%) has increased slightly from 17.1% in the last report card, primarily due to improved mapping methods and some natural succession (see Forest Area Gained table). The Environment Canada (EC) guideline for sustaining species and water quality in southern Ontario is a minimum of 30% forest cover. Meadows and thickets add another 3.3% cover for a total of 20.9% natural vegetation cover.

The percent forest interior (2.3%) is low, indicating most woodlots are too small and narrow to support area sensitive species such as Scarlet Tanager and Ovenbird. The EC guideline for southern Ontario is 10% forest interior.

The percent riparian zone forested (48.5%) has increased from 43.8% in the last report card, primarily due to improved mapping methods. Levels are close to the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (14.3%) for a total of 62.8% riparian zone vegetated.

Indicators	Trout Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	17.6 C	11.3 D	30.0 B	Percent forest cover is the percentage of the watershed that is forested or wooded. Forest cover includes upland and wetland forest types.
% Forest Interior	2.3 F	1.5 F	10.0 B	Percent forest interior is the percentage of the watershed that is forest interior. Forest interior is the protected core area 100 m inside a woodlot that some bird species require to nest successfully. The outer 100 m is considered "edge" habitat and prone to high predation, wind damage and alien species invasion.
% Riparian Zone Forested	48.5 B	35.7 C	50.0 B	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions including water quality protection.

\* 2022 report card data is based on 2015 colour air photography. \*\* EC Guideline - Environment Canada guideline based on "How much habitat is enough?" 2013. Grades based on Conservation Ontario (2022).

## Losses and Gains

### Forest Area Removed

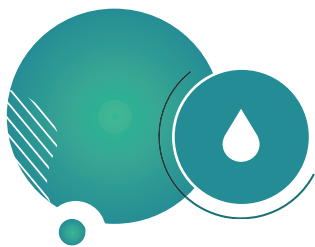
Years	ha	
2000-2006	22	Approximately 11 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 33 ha of forest were cleared in the previous 10 years.
2006-2010	11	
2010-2015	11	

### Forest Area Gained

Years	ha	
2010-2015	55	New data shows that approximately 55 ha of forest were gained between 2010 and 2015 due to forest succession and improved mapping. Several 20- to 30-year-old tree planting sites and some thickets matured to the point where they could be classified as mature woodland in 2015. This data demonstrates the value of continued tree planting and conservation efforts.



Red-bellied Woodpeckers nest locally in tree cavities often at the edge of woodlands. Photo: Sharon Nethercott



# Groundwater

## Municipal Water Supply

The Town of St. Marys has three municipal wells that draw groundwater from a bedrock aquifer, and supply water to about 7,300 people. These are designated as GUDI (groundwater under direct influence of surface water) wells as the bedrock in this area is fractured and close to the surface. Municipal well water is tested and treated.

## Private Wells

Approximately 510 private wells are on record in this watershed, drawing from overburden and bedrock aquifers. Properly constructed deep wells have a lower risk of contamination from the surface than shallow wells. The highest risk to a well is from contaminants and activities closest to the well. The safety, testing, and treatment of a private well are the responsibility of the well owner.

## Groundwater Monitoring

The Provincial Groundwater Monitoring Network has shown groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). Recent data shows the recharge period is shifting later to November to May, with a trend of warmer and drier weather from October to November and cooler temperatures in May.

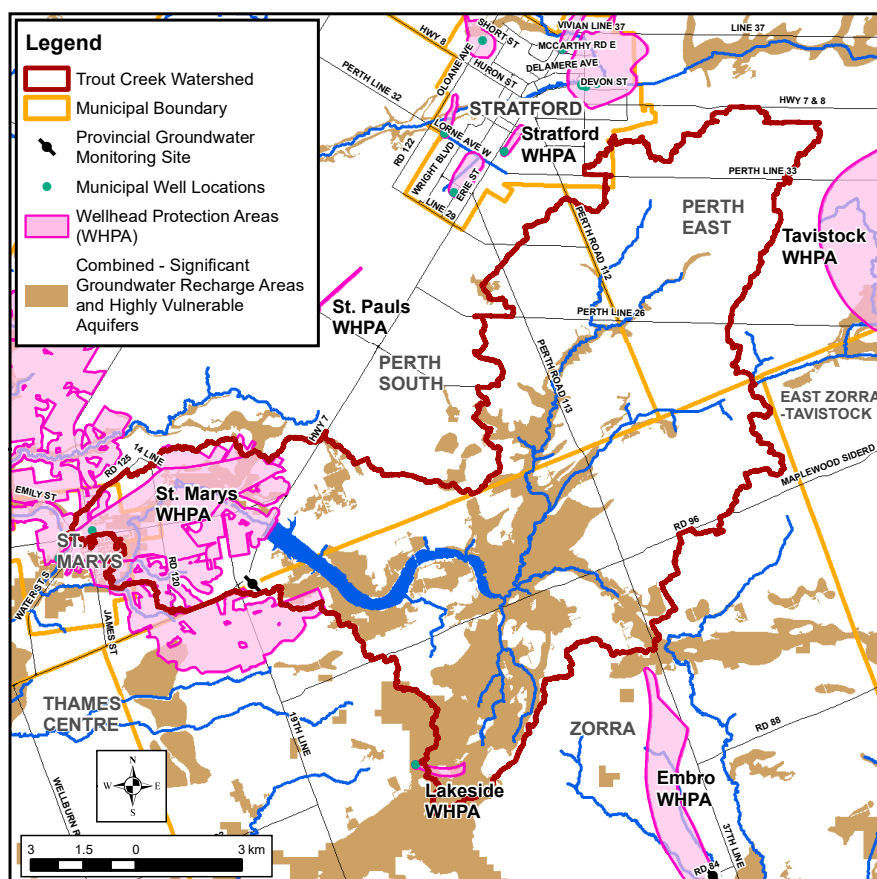
The rate of decline in groundwater levels is directly related to maximum air temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

### Did you know?

- About 50-70% of total local streamflow is baseflow from groundwater discharging into streams.
- Vegetation relies more on groundwater as it is more stable than rainfall. Most remaining wetlands are groundwater dependent.

## Drinking Water Source Protection

Local source protection plans have been completed to protect sources of municipal drinking water. The Thames-Sydenham and Region Source Protection Plan (2015) has policies to address risks to municipal water systems. Visit [www.sourcewaterprotection.on.ca](http://www.sourcewaterprotection.on.ca) for information on groundwater resources, Source Protection Plan policies, and the Water Supply System Summary for St. Marys.



## On The Map

### Significant Groundwater Recharge Areas:

Areas where a relatively large volume of water makes its way from the ground's surface down to the aquifer.

### Highly Vulnerable Aquifers:

Areas where there is a relatively fast pathway from the ground's surface down to an aquifer, generally making the aquifer more vulnerable to contamination.

### Wellhead Protection Areas:

Areas surrounding the wellhead, through which contaminants are reasonably likely to move toward or reach the well.

**Protecting these areas is very important for the protection of local groundwater as a source of drinking water.**



# Local Actions for Improvement

Individuals, groups, businesses, municipalities, and agencies all have a role in improving the health of the watershed through these suggested actions. For more information on agencies that can help, contact the UTRCA (see page 8).

A number of the local actions listed below are also identified in the following reports:

- The Thames River (Deshkan Zibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019)
- Oxford Natural Heritage Systems Study (Oxford County, 2016 draft)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Trout Creek Watershed Action Plan (UTRCA, 2011) and Trout Creek Technical Background Summary (UTRCA, 2009)
- Reservoir Water Quality Treatment Study (Nurnberg and LaZert, 2006)

## Local Actions to Improve Surface Water and Groundwater

- Protect and establish buffers (native trees, grasses) along watercourses to cool streams, provide food for aquatic species, stabilize banks, and trap and absorb nutrients and other pollutants.
- Evaluate the role, function and aquatic habitat impacts of all barriers and consider removal or modification to improve stream health and fish passage.
- Use drain maintenance methods that protect aquatic habitat (e.g., low flow channels, spot or bottom cleanouts).
- Repair or replace faulty septic systems and ensure proper maintenance of the system.
- Continue to implement agricultural Best Management Practices (BMPs):
  - Use reduced tillage and establish cover crops to protect soil from erosion, prevent nutrient loss, and build soil health.
  - Reduce nutrient loss from cropland (4R Stewardship Approach: right source, right rate, right time, right place).
  - Use best practices in manure storage and spreading, pesticide and fertilizer storage and application, fuel storage, and restricting livestock access to watercourses.
  - Complete and follow Environmental Farm Plans and Nutrient Management Plans ([www.omafra.gov.on.ca](http://www.omafra.gov.on.ca)).
  - Utilize grants for stewardship work from the UTRCA Clean Water Program ([www.cleanwaterprogram.ca](http://www.cleanwaterprogram.ca)).
- In urban areas, continue the following actions:
  - For new development, implement urban stormwater planning using Low Impact Development (LID), stormwater BMPs, subwatershed studies, catchment area planning, and erosion control.
  - Incorporate LID into the planning process and promote the implementation of LID techniques, including in Master Plans, Secondary Plans, and any subwatershed studies.
  - Consider using a water balance and landscape approach for inbuilt and new development to manage stormwater runoff.
  - Maintain base flow to natural heritage features through water balance.
  - For existing development, implement pollution prevention and control planning for all aspects of stormwater runoff including combined storm-sewer overflows.
  - Continue to upgrade sewer systems where risk of contamination is greatest (e.g., extend sanitary sewers to urban properties on septic systems).
  - Minimize use of fertilizers, adhere to Ontario's Cosmetic Pesticide Ban, and utilize the municipal hazardous waste disposal program.



Low Impact Development techniques such as rain gardens help reduce stormwater runoff to local streams in developed areas.



## Local Actions to Improve Drinking Water

- Decommission abandoned wells according to Ministry of Environment, Conservation, and Parks standards.
- Homeowners with wells should understand the condition of their well and risks to their water supply (see [www.wellaware.ca](http://www.wellaware.ca)).
- Sample private wells each spring and fall (available through the Health Unit).
- Keep contaminants (e.g., fuel, pesticides, manure, waste) away from your well area. Consider septic system inspections (see [www.omafra.gov.on.ca](http://www.omafra.gov.on.ca))
- To protect municipal drinking water sources, implement Source Protection Plan policies.

## Local Actions to Improve Forests and Vegetation Cover

- Connect the existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along Trout Creek and its tributaries.
- Create wildlife corridors between woodlots by planting shelterbelts, windbreaks, and buffers along fields and watercourses, which will also protect against soil erosion.
- For tree planting and naturalization projects, create a more natural and diverse habitat by using a variety of native plant species that are better adapted to the local climate, pests, etc. The UTRCA provides tree planting assistance/advice and grants may be available (see contact information on page 8).
- Municipalities can conserve woodlands, wetlands, and other natural areas by strengthening tree conservation by-laws and enforcement, Official Plan designations, and providing landowner incentives and education.
- Increase forest interior by making woodlots larger and wider by planting native trees and shrubs along the edges or allowing the edges to naturalize on their own.
- Landowners wishing to selectively log their woodlots should use Good Forestry Practices (i.e., Basal Area Guidelines, not Diameter Limit Harvesting) and hire a Certified Tree Marker to mark the woodlot and oversee harvesting.
- Woodlot owners can improve the health of their woodlots by identifying and removing alien invasive species such as buckthorns (see [ontarioinvasiveplants.ca](http://ontarioinvasiveplants.ca), [thamesriver.on.ca](http://thamesriver.on.ca)). Keeping out livestock and unauthorized motorized vehicles also protects habitat quality.
- Target land retirement and naturalization projects on highly erodible soils.

## Great Lakes Connection

The Trout Creek watershed is in the Thames River watershed which is part of the Lake Erie watershed. Water from Trout Creek enters the North Thames River in St. Marys and takes 4-10 days to flow through London, Chatham, and into Lake St. Clair. About two weeks later, it reaches Lake Erie via the Detroit River.

## Shared Waters Approach

In 2012, partners in the Thames River watershed formed the Thames River Clear Water Revival to work together on the protection of water, with the shared goal of a healthy and vital Thames River which would also benefit Lake St. Clair and Lake Erie. This partnership brings together Indigenous peoples, three levels of government, two local conservation authorities, and the local community. A state of the environment report with a focus on actions needed for water quantity and quality was completed in 2019: The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity. Implementation by all partners is underway. The Shared Waters Approach contains significant input from four of the eight distinct First Nations whose traditional territory includes the Thames River watershed and highlights the positive participation and sharing of traditional ecological knowledge within this approach.





## 2022 Watershed Report Card

# Highlights of Progress Since 2017

The Trout Creek watershed is benefiting from many conservation efforts that continue to be implemented by individuals, groups, businesses, agencies, and municipalities on private and public lands. Examples of activities since 2017 include:

- In 2021, Perth South held its first Tree Power, a partnership between the UTRCA and the Municipality. A total of 300 trees were available and residents of Perth South were able to order their choice of five native hardwood tree species. The goal was to increase tree cover in the area.
- The Town of St. Marys and the UTRCA implemented a plan to control Dog-strangling Vine and Common Periwinkle in the Sparling Bush woodlot in 2020. Controlling non-native invasive species was one of four strategic priorities identified in the Sparling Bush Plan (2020-2022). In 2021, hundreds of pollinator plants were planted next to Sparling Bush.
- The Canadian Forest Service is conducting research on a stand of ash trees in Wildwood Conservation Area (CA) to investigate the effectiveness of natural predators (two wasp species) on controlling the Emerald Ash Borer. This study will help find ways to control this destructive non-native insect that has killed millions of ash trees.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. For example, Zorra Township has climate change adaptation requirements recognized through Oxford County's Future Oxford objectives including a target of 100% renewable energy by 2050. In Perth County, the Municipalities share a Climate Change Coordinator. There is also a commitment to reducing emissions and taking action on climate change by the Federation of Canadian Municipalities under the Partners for Climate Protection Program, a network of more than 350 Canadian municipal governments.
- More than 24,100 trees were planted at 27 sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Through UTRCA's Communities for Nature program (2016-2020), 850 students and 280 community members helped plant 3,900 trees and 3,100 wildflowers and grasses at eight sites. The site included Wildwood CA, St. Marys Memorial Forest, TD Tree Days locations, and Sparling Bush. Stratford Scouts helped with some of the plantings.
- Watershed landowners completed 17 Clean Water Program (CWP) projects including fragile land retirement/ reforestation, erosion control measures, wellhead protection, and woodland enhancement. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (see [www.cleanwaterprogram.ca](http://www.cleanwaterprogram.ca)). Since 2001, 132 projects have been completed in this watershed.



More farmers are using cover crops on their fields to reduce soil loss over the winter/spring period and improve downstream water quality.



Students plant a pollinator garden with assistance of UTRCA and Town of St. Marys staff.



### Ontario-Wide Report Cards

Conservation Authorities produce report cards for their watersheds every five years to track changes, using a standardized grading system ([www.conservationontario.ca](http://www.conservationontario.ca)). Grades vary across the province, reflecting the range of physical characteristics and human activities. The complete set of UTRCA report cards and supporting information are available in a report titled 2022 Upper Thames River Watershed Report Cards ([thamesriver.on.ca](http://thamesriver.on.ca)).

### For more information, contact:

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