



Surface Water Quality
C - Steady

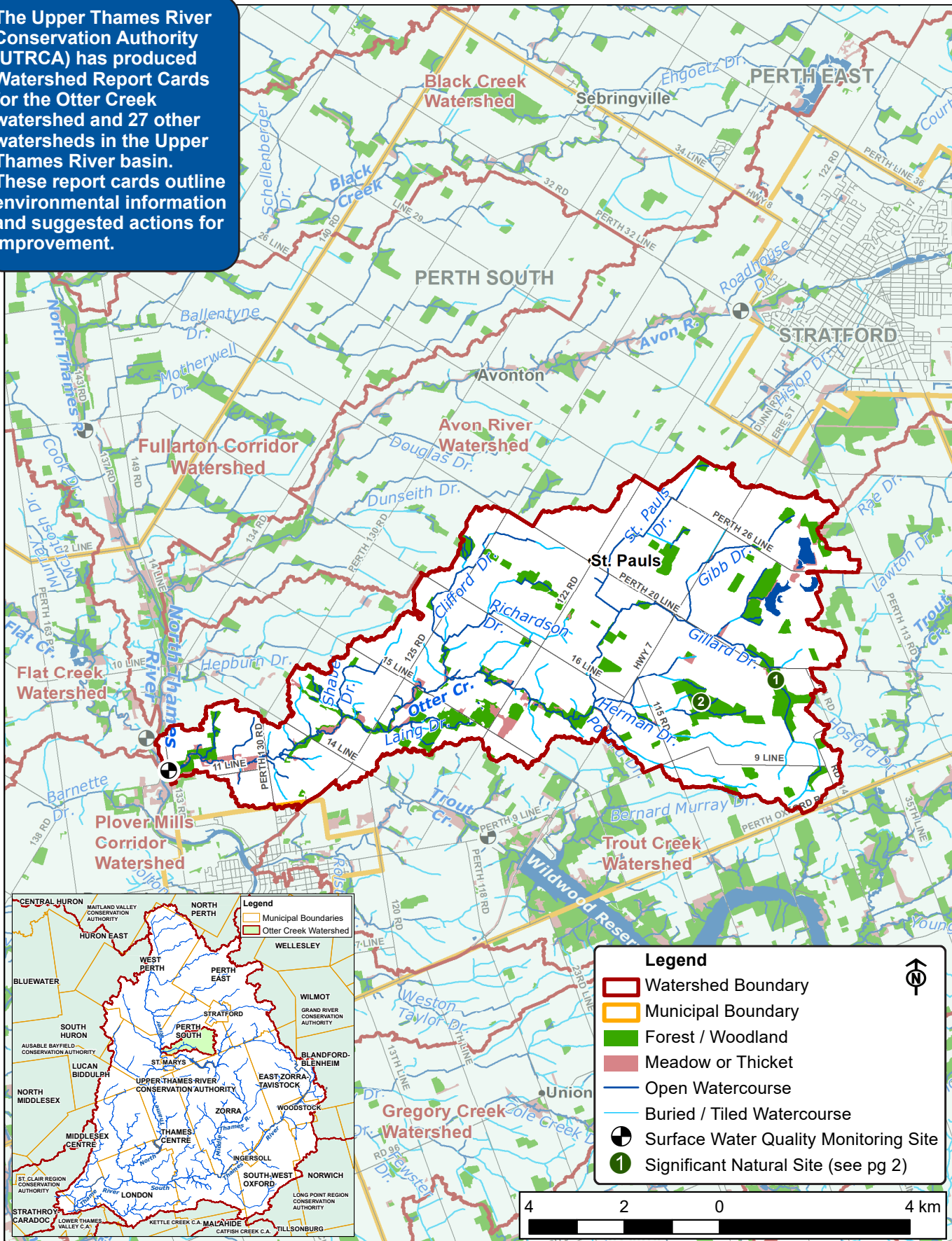


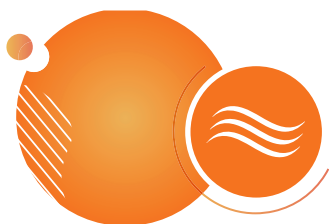
Forest Conditions
D - Slight Decline

2022 Watershed Report Card

Otter Creek

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Otter 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	Perth South (60 km ²). Otter Creek makes up 2% of the Upper Thames River watershed.																						
Significant Natural Sites	Significant Wetlands: (1) Gillard Drain Complex. Other Wetlands: (2) Conroy Woods. See numbered sites on map.																						
Land Cover	82% agriculture, 12% natural vegetation, 1% open space, 4% built-up/urban, 1% aggregates, 1% water. There is 0.7% less agriculture compared to five years ago. There is 2% impervious cover (e.g., hard surfaces such as roofs and roads).																						
Population	653 in 2021; a slight decline from 2016, but this may be partly due to watershed boundary corrections.																						
Soil Type	84% silty loam, 8% bottomland, 5% clay loam, 2% organic, 1% loam																						
Physiography	100% undruminized till plain																						
Soil Erosion/Delivery	6% 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	71% of the watershed has agricultural field tile (15% random + 56% systematic), 4% urban drainage, 25% no tiling. An additional 3% of the watershed is tiled compared to five years ago.																						
Watercourse Characteristics	<table border="1"> <tr> <td>Total length:</td> <td>99 km of watercourses</td> </tr> <tr> <td>Watercourse type:</td> <td>28% natural, 38% channelized, 34% buried/closed</td> </tr> <tr> <td>Temperature:</td> <td>23% cool/coldwater, 77% warmwater/unconfirmed</td> </tr> <tr> <td>Main channel slope:</td> <td>0.40% slope (moderately high); range is 0.09-1.26% in the Upper Thames River watershed</td> </tr> </table>	Total length:	99 km of watercourses	Watercourse type:	28% natural, 38% channelized, 34% buried/closed	Temperature:	23% cool/coldwater, 77% warmwater/unconfirmed	Main channel slope:	0.40% slope (moderately high); range is 0.09-1.26% in the Upper Thames River watershed														
Total length:	99 km of watercourses																						
Watercourse type:	28% natural, 38% channelized, 34% buried/closed																						
Temperature:	23% cool/coldwater, 77% warmwater/unconfirmed																						
Main channel slope:	0.40% slope (moderately high); range is 0.09-1.26% in the Upper Thames River watershed																						
Dams and Barriers	Four barriers to fish passage have been recorded in this watershed, mostly perched culverts, debris blockages, and beaver dams.																						
Spills	<table border="1"> <thead> <tr> <th>2001-2005</th> <th>2006-2010</th> <th>2011-2015</th> <th>2016-2020</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>3</td> <td>3</td> <td>4</td> </tr> </tbody> </table> <p>Recent reported spills involved fuels and industrial chemicals.</p>	2001-2005	2006-2010	2011-2015	2016-2020	0	3	3	4														
2001-2005	2006-2010	2011-2015	2016-2020																				
0	3	3	4																				
Sewage Treatment	There are no sewage treatment plants discharging into Otter Creek. Properties in the area are serviced by private septic systems.																						
% Vegetation Cover and Types	<table border="1"> <tr> <td>Vegetation cover:</td> <td>690 ha or 11.6% of the Otter Creek watershed</td> </tr> <tr> <td>Composition:</td> <td>68% deciduous forest, 11% mixed forest, 4% plantation/coniferous forest, 15% meadow, 2% thicket</td> </tr> </table>	Vegetation cover:	690 ha or 11.6% of the Otter Creek watershed	Composition:	68% deciduous forest, 11% mixed forest, 4% plantation/coniferous forest, 15% meadow, 2% thicket																		
Vegetation cover:	690 ha or 11.6% of the Otter Creek watershed																						
Composition:	68% deciduous forest, 11% mixed forest, 4% plantation/coniferous forest, 15% meadow, 2% thicket																						
Wetland Cover	4.6% (274 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 0.3 ha of wetland cover were lost between 2010 and 2015.																						
Woodlot or Patch Size	<table border="1"> <thead> <tr> <th>Size Category</th> <th>Number of Woodlots</th> <th>Average Size (ha)</th> <th>Total Woodland Area (ha)</th> <th>% of Woodland Area</th> <th>Largest Woodlot (ha)</th> </tr> </thead> <tbody> <tr> <td>Small (< 10 ha)</td> <td>48</td> <td>3</td> <td>157</td> <td>27</td> <td rowspan="3">70</td> </tr> <tr> <td>Medium (10-30 ha)</td> <td>10</td> <td>15</td> <td>154</td> <td>27</td> </tr> <tr> <td>Large (> 30 ha)</td> <td>5</td> <td>52</td> <td>262</td> <td>46</td> </tr> </tbody> </table>	Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)	Small (< 10 ha)	48	3	157	27	70	Medium (10-30 ha)	10	15	154	27	Large (> 30 ha)	5	52	262	46
Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)																		
Small (< 10 ha)	48	3	157	27	70																		
Medium (10-30 ha)	10	15	154	27																			
Large (> 30 ha)	5	52	262	46																			
Fish and Mussels	<p>Fish Species: 31 species Gamefish: Small and Largemouth Bass, and Northern Pike Mussel Species: 7 species</p>																						
Species-at-Risk	<p>Birds: 7 species including Chimney Swift and Wood Thrush Fish: Northern Sunfish Mussels: Rainbow Reptiles: Snapping Turtle</p>																						

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.



Surface Water Quality

Surface water quality in Otter Creek has remained steady since the last watershed report card and scores an overall grade of C. In 2002, a water quality monitoring station was added to Otter Creek at Road 133 (see map). The UTRCA has a water quality target of a B grade for Otter Creek by 2037.

Phosphorus levels have remained steady since 2017 and are better than the Upper Thames River average.

Fecal bacteria (*E. coli*) levels have been steady and are below the Upper Thames River average. Nitrate levels (from sources like fertilizer and waste) remain above the guideline

for aquatic life. Chloride (mainly from road salt) remains at low levels in Otter Creek and well below the aquatic life guideline.

Water quality or stream health, based on benthic monitoring, decreased slightly since the past reporting period. However, it displays higher benthic water quality than the Upper Thames River watershed average. Much of the lower portion of Otter Creek flows through a relatively undisturbed, natural channel which benefits aquatic ecosystem health and water quality.

Indicators	Otter Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.037 C	0.029 B	0.057 C	0.074 D Steady	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.
Bacteria (CFU <i>E. coli</i> / 100 ml) **	No data	223 C	318 D	167 C	145 C Steady	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.
Benthic Score (FBI)	6.11 D	6.15 D	5.85 D	5.49 C	5.59 C Steady	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 Otter Creek, the Rainbow Darter lacks a swim bladder, a gas-filled sac that many fish species have to keep them buoyant in the water. Without it, Rainbow Darters exhibit a characteristic swim pattern of shooting forward a short distance then sinking to the bottom and resting before shooting forward again. To remain stationary in preferred habitat (fast moving riffles), Rainbow Darters hide behind large rocks on the bottom of the watercourse.



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.



Forest Conditions

Forest conditions in the Otter Creek watershed have declined slightly since the last report card, scoring an overall grade of D. It should be noted that some of the change is due to improved mapping methods.

The percent forest cover (9.6%) has decreased from 9.9% in the last report card, primarily due to improved mapping. 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 2.5% cover, for a total of 13.5% natural vegetation cover in the Otter Creek watershed.

The percent forest interior (0.9%) has decreased slightly from 1%. 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 (34.3%) has increased from 25.8%, moving up a letter grade. The improvement is primarily due to improved mapping methods. Levels are still below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (11.6%) for a total of 46.0% riparian zone vegetated.

Indicators	Otter Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	9.6 D	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	0.9 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	34.3 C	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	10
2006-2010	3
2010-2015	4

Approximately 4 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 13 ha of forest were cleared in the previous 10 years.

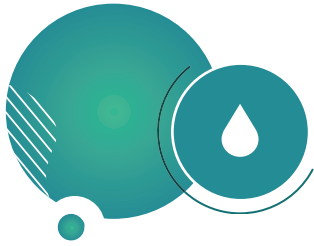
Forest Area Gained

Years	ha
2010-2015	10

New data shows that approximately 10 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.



White-breasted Nuthatches nest locally in tree cavities in deciduous and mixed woodlands.
Photo: Sharon Nethercott.



2022 Watershed Report Card

Groundwater

Municipal Water Supply

A municipal well in St. Pauls draws groundwater from a deep bedrock aquifer and supplies approximately 90 people. Municipal water is tested and treated.

Private Wells

Approximately 152 private wells are on record in this watershed, most drawing from 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 to 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

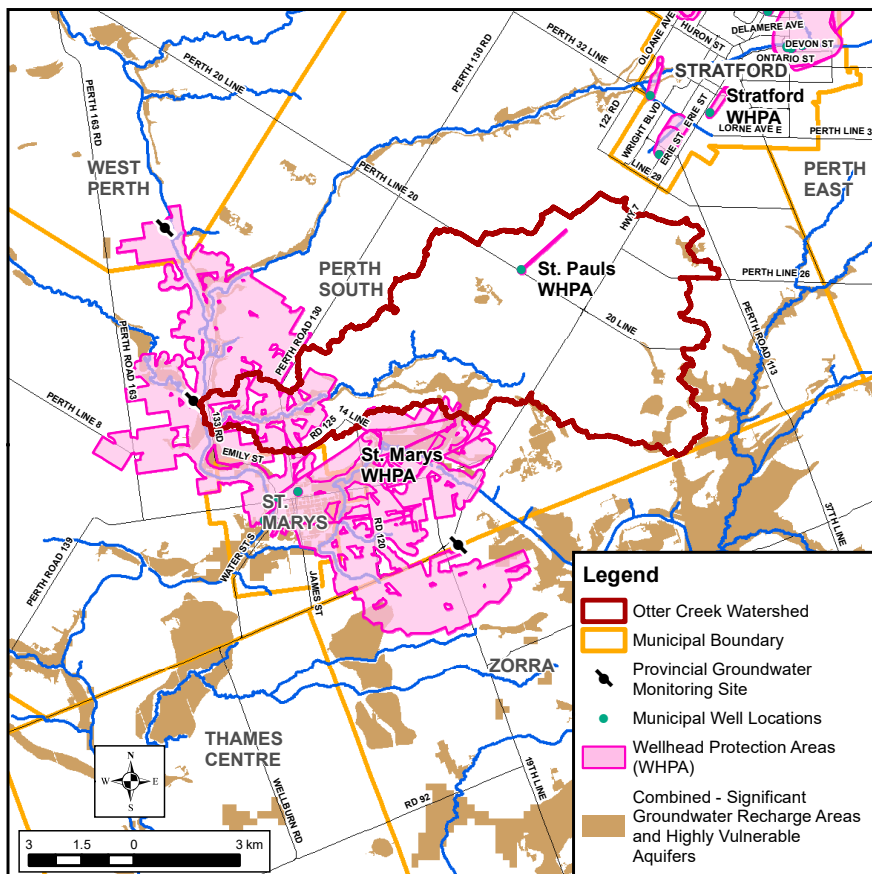
typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

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 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 for information on groundwater resources, Source Protection Plan policies, and a Water Supply System Summary for St. Pauls.



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 Ziibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019)
- Perth Natural Heritage Systems Study (Perth County, 2018 and 2019)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Recovery Strategy for the Thames River Aquatic Ecosystem (Thames River Recovery Team, 2005)

Local Actions to Improve Surface Water and Groundwater

- Increasing stream-side vegetation is a priority. 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.
- 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.
- Target this watershed for additional fish and benthic monitoring. Aquatic ecosystem information is lacking or outdated for much of this watershed.
- Adhere to Ontario's Cosmetic Pesticide Ban and utilize the municipal hazardous waste disposal program.
- 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).
 - Utilize grants for stewardship work from the UTRCA Clean Water Program (www.cleanwaterprogram.ca).



Agricultural practices such as the use of cover crops and minimal tillage help the climate by reducing carbon loss while improving water quality and soil health.



The UTRCA's Private Land Reforestation Program helps landowners create habitat, retire fragile agricultural land, plant windbreaks, and more.

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).
- 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)
- To protect municipal drinking water sources, implement Source Protection Plan policies.

Local Actions to Improve Forests and Vegetation Cover

- Connect and extend existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along Otter Creek and its tributaries.
- 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 and 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 quality of their woodlots by identifying and removing invasive alien species such as buckthorn (see www.ontarioinvasiveplants.ca and www.thamesriver.on.ca). Keep out livestock and unauthorized motorized vehicles to protect habitat quality.

Great Lakes Connection

The Otter Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the Otter Creek enters the North Thames upstream of 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.





Highlights of Progress Since 2017

The Otter 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:

- Perth South held its first Tree Power in 2021, a partnership between 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: American sycamore, basswood, red maple, swamp white oak, and river birch. The aim of Tree Power is to increase tree and leaf cover.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. For Perth County municipalities, there is a shared Climate Change Coordinator. The municipalities have 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.
- Over 2,500 trees were planted at 10 sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Watershed landowners completed two Clean Water Program (CWP) projects involving fragile land retirement/reforestation and erosion control measures. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (see www.cleanwaterprogram.ca). Since 2001, 40 projects have been completed in this watershed.
- Interest in conservation continues to bring good attendance to the UTRCA's annual Rural Landowner workshop in St. Marys. The workshop includes presentations about healthy forests, sustainable woodlot management, and soil health.
- Perth County contracted the UTRCA to complete the Perth County Natural Heritage Systems Study (Perth County, 2018 and 2019) to identify existing natural heritage features on the landscape.



In 2022, trees available through Tree Power in Perth South included Autumn Fantasy Maple, Black Cherry, Downy Serviceberry, Hackberry, Red Maple, Red Oak, and Sugar Maple.



There are 31 fish species recorded in Otter Creek including White Sucker (shown), Blackside Darter, Fathead Minnow, Largemouth Bass, Northern Pike, and Rainbow Darter.



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). 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).

For more information, contact:

Upper Thames River Conservation Authority
1424 Clarke Road, London, Ontario, Canada N5V 5B9
519-451-2800
infoline@thamesriver.on.ca
www.thamesriver.on.ca

