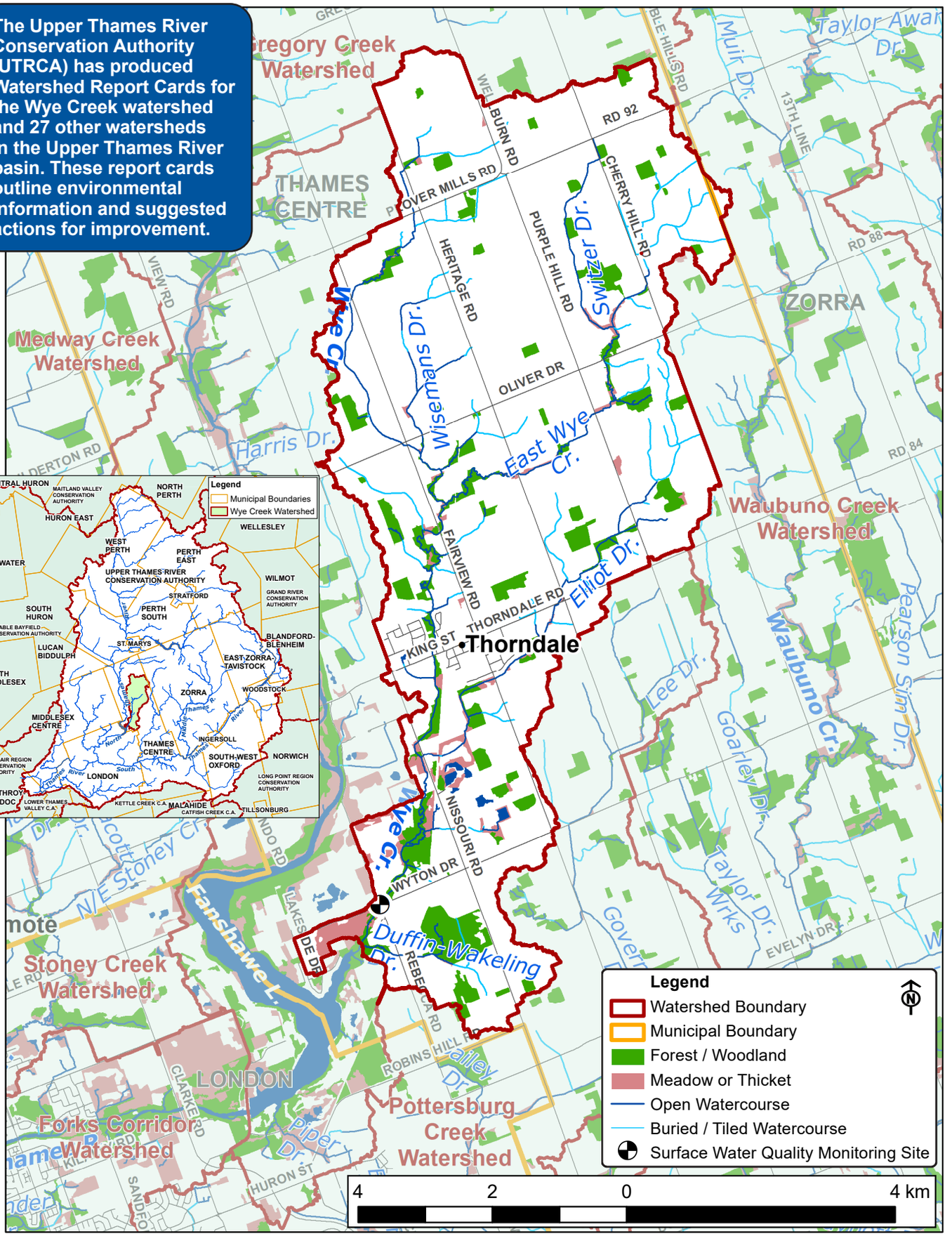
Surface Water Quality
D - Improved

Forest Conditions
D - Steady

2022 Watershed Report Card

Wye Creek

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



2022 Watershed Report Card

Watershed Features

<table>
<tr><th>Feature</th><th>Description</th></tr>
<tr><td>Municipalities</td><td>Thames Centre (100%, 53 km^2), 2% of the Upper Thames River watershed</td></tr>
<tr><td>Significant Natural Sites</td><td>None</td></tr>
<tr><td>Land Cover</td><td>80% agriculture, 11% natural vegetation, 1% open space, 7% urban/built-up, 1% aggregates, 1% water. There is 0.8% less agriculture, 0.6% less aggregates, 0.4% more open space, and 1% more urban than five years ago. 3% impervious cover (e.g., hard surfaces such as roofs and roads).</td></tr>
<tr><td>Population</td><td>2,025 in 2021; a 31% increase since 2015</td></tr>
<tr><td>Soil Type</td><td>43% silty loam, 33% clay loam, 12% coarse sand, 10% bottomland, 1% fine sandy loam, 1% sandy loam</td></tr>
<tr><td>Physiography</td><td>75% undrumlinized till plain, 14% spillway, 6% till moraine, 4% sand plain</td></tr>
<tr><td>Soil Erosion/ Delivery</td><td>2% 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%.</td></tr>
<tr><td>Tiling and Drainage</td><td>66% of the watershed has agricultural field tile (13% random + 52% systematic), 7% urban drainage, 28% no tiling. An additional 5% of the watershed is tiled/drained compared to five years ago.</td></tr>
<tr><td>Watercourse Characteristics</td><td>Total length: 81 km of watercourses
Watercourse type: 27% natural, 31% channelized, 42% buried/closed
Temperature: 32% cool/coldwater, 68% warmwater/unconfirmed
Main channel slope: 0.52% slope (steep); range is 0.09-1.26% in Upper Thames River watershed</td></tr>
<tr><td>Dams and Barriers</td><td>Four barriers to fish passage have been recorded in this watershed. Barriers include dams, weirs, perched culverts, beaver dams, and stormwater ponds.</td></tr>
<tr><td>Spills</td><td><table><tr><th>2001-2005</th><th>2006-2010</th><th>2011-2015</th><th>2016-2020</th></tr><tr><td>1</td><td>3</td><td>2</td><td>2</td></tr></table>Most recent spills involved industrial chemicals.</td></tr>
<tr><td>Sewage Treatment</td><td>There are no sewage treatment plants discharging into Wye Creek. The Thorndale Wastewater Treatment Plant services Thorndale and discharges treated effluent to the North Thames River. All other rural properties are serviced by private septic systems.</td></tr>
<tr><td>% Vegetation Cover and Types</td><td>Vegetation cover: 536 ha or 10.1% of the watershed
Composition: 73% deciduous forest, 4% mixed forest, 1% plantation/coniferous forest, 18% meadow, 3% thicket</td></tr>
<tr><td>Wetland Cover</td><td>2.9% (155 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 1.5 ha of wetland cover was lost between 2010 and 2015.</td></tr>
<tr><td>Woodlot or Patch Size</td><td><table><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><tr><td>Small (< 10 ha)</td><td>56</td><td>3</td><td>162</td><td>39</td><td rowspan="3">59</td></tr><tr><td>Medium (10-30 ha)</td><td>12</td><td>13</td><td>157</td><td>37</td></tr><tr><td>Large (> 30 ha)</td><td>2</td><td>51</td><td>101</td><td>24</td></tr></table></td></tr>
<tr><td>Fish and Mussels</td><td>Fish Species: 37
Gamefish: Yellow Perch, Smallmouth and Largemouth Bass
Mussel Species: 2</td></tr>
<tr><td>Species-at-Risk</td><td>Birds: 8 species including Canada Warbler and Wood Thrush
Fish: Black Redhorse and Silver Shiner
Insects: Monarch
Reptiles: Snapping Turtle</td></tr>
</table>

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.

2022 Watershed Report Card

Surface Water Quality

Surface water quality in Wye Creek has improved since the last report card and scores an overall grade of D. A water quality monitoring station was added to Wye Creek in 2002 (see map). The UTRCA has a water quality target of a C grade for Wye Creek by 2037.

Phosphorus levels have improved since the last report card but remain above the Upper Thames River average, and well above the aquatic guideline. *E.coli* bacteria levels score a C grade. They have been steady and are better than the Upper Thames River average. Nitrate levels (from sources such as fertilizer and waste) remain above the guideline for aquatic life. Chloride levels (mainly from road salt) are low and below the aquatic guideline.

Stream health, based on benthic scores, declined during this reporting period. The benthic score indicates lower water quality than the Upper Thames River average, but it is still in line with past reporting periods.

Indicators	Wye Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.098 D	0.138 D	0.184 F	**0.127 D Improved**	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 *E. coli*/ 100 ml) **	No data	249 C	161 C	170 C	**141 C Steady**	211 C	200 C Recreation	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/ wildlife/pets) waste. *E. coli* is a strong indicator of the potential to have other disease-causing organisms in the water.
Benthic Score (FBI)	6.17 D	6.12 D	5.80 D	5.84 D	**6.17 D Declined**	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 Wye Creek, Yellow Perch do not build nests. Instead, the female releases unique, transparent, gelatinous, accordion-folded strings of eggs that are looped over vegetation and woody debris on the stream bottom. These strings can be as long as 2 m, as heavy as 1 kg, and contain an average of 23,000 eggs. They are an important part of the diets of other fishes.

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.

Grade: D Steady

2022 Watershed Report Card

Forest Conditions

Forest conditions in the Wye Creek watershed have remained fairly steady since the last report card and score an overall grade of D.

The percent forest cover (8.0%) is unchanged since the last report card. 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 2.2% cover for a total of 10.1% natural vegetation cover.

The percent forest interior (0.7%) is very low, indicating that 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%.

The percent riparian zone forested (34.7%) has decreased slightly from 35.6% primarily due to mapping improvements. Levels are below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (13.0%) for a total of 47.7% riparian zone vegetated.

Indicators	Wye Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	**8.0 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	**0.7 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	**34.7 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	14
2006-2010	<1
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 14 ha of forest were cleared in the previous 10 years.

Forest Area Gained

Years	ha
2010-2015	7

New data shows that approximately 7 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 forests 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.

Groundwater

Municipal Water Supply

Two municipal wells in Thorndale draw groundwater from a confined limestone aquifer and supply approximately 800 people. Municipal water is tested and treated.

Private Wells

Approximately 300 private wells are on record in the Wye Creek watershed, drawing from both bedrock and overburden aquifers. Properly constructed deep wells have a lower risk of contamination from the surface than shallow wells. The highest risk to any 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

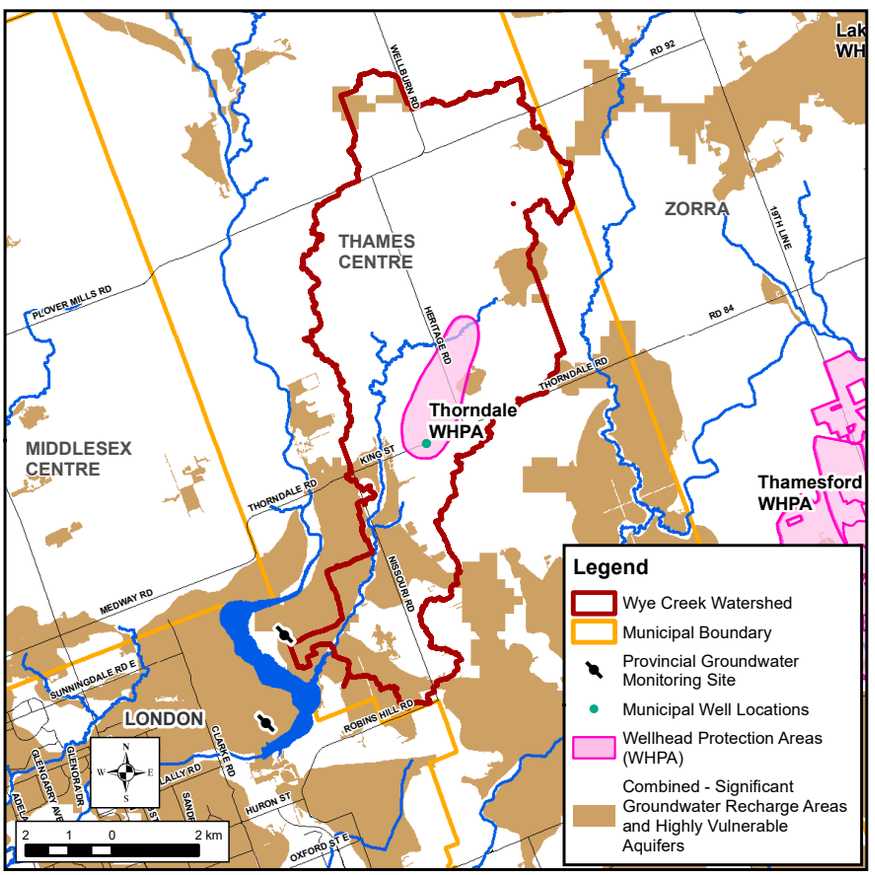
The Provincial Groundwater Monitoring Network has shown groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). Recent data shows the recharge period is shifting later to November to May, 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 for information on groundwater resources, Source Protection Plan policies, and the Water Supply System Summary for Thorndale.



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.

2022 Watershed Report Card

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)
- Upper Thames River Source Protection Area Approved Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- Thorndale Wastewater Treatment Plant Existing Natural Environment Conditions Report (Stantec Consulting Limited, 2011)
- Recovery Strategy for the Thames River Aquatic Ecosystem (Thames River Recovery Team, 2005)

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.
- Wye Creek provides spawning and rearing habitat for gamefish and species-at-risk in the Fanshawe Reservoir and North Thames River. Protect and enhance in-stream habitat and riparian cover.
- Historically, Wye Creek was a coldwater stream. Continue temperature monitoring to determine if coldwater conditions are recovering with increased riparian vegetation cover.
- Assess the purpose of the four dams/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).
  - Utilize grants for stewardship work from the UTRCA Clean Water Program (www.cleanwaterprogram.ca).
- In Thorndale, 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.

The use of cover crops and minimal tillage helps the climate by reducing carbon loss while improving water quality and soil health.

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 the existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along Wye Creek and its tributaries.
- Connect woodlots by planting shelterbelts, windbreaks, and buffers along fields and watercourses, which will also protect against soil erosion and improve water quality. Older, denser windbreaks should be thinned.
- 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).
- Increase natural vegetation cover in urban areas by naturalizing manicured urban parks and open spaces, river valleys, residential and industrial areas, and school yards.
- 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, thamesriver.on.ca). Keeping out livestock and unauthorized motorized vehicles also protects habitat quality.

Great Lakes Connection

The Wye Creek watershed is in the Thames River watershed which is part of the Lake Erie watershed. Water from Wye Creek enters the North Thames River in at Fanshawe Reservoir 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 Wye 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 2020, UTRCA staff planted 200 memorial trees at the Furtney Memorial Forest in Fanshawe Conservation Area. The UTRCA has memorial forests in London, St. Marys and area, Thamesford/Zorra Township, and Woodstock.
- Recent UTRCA fish sampling recorded new species for this watershed including Quillback and Mottled Sculpin. The fish species total is 37 for Wye Creek.
- Over 2,170 trees were planted at nine sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Through UTRCA's Communities for Nature program (2016-2020), 215 students helped plant 660 trees and 1,500 aquatic plants at three sites. Sites include Furtney Memorial tree sites, Thorndale Community Centre, and a stormwater management pond in Thorndale.
- Watershed landowners completed two Clean Water Program (CWP) projects including 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, 72 projects have been completed in this watershed.

UTRCA staff planting trees in the Furtney Memorial Forest.

Quillback

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

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:

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UPPER THAMES RIVER CONSERVATION AUTHORITY

Thames Canadian Heritage River