



Surface Water Quality
C - Steady

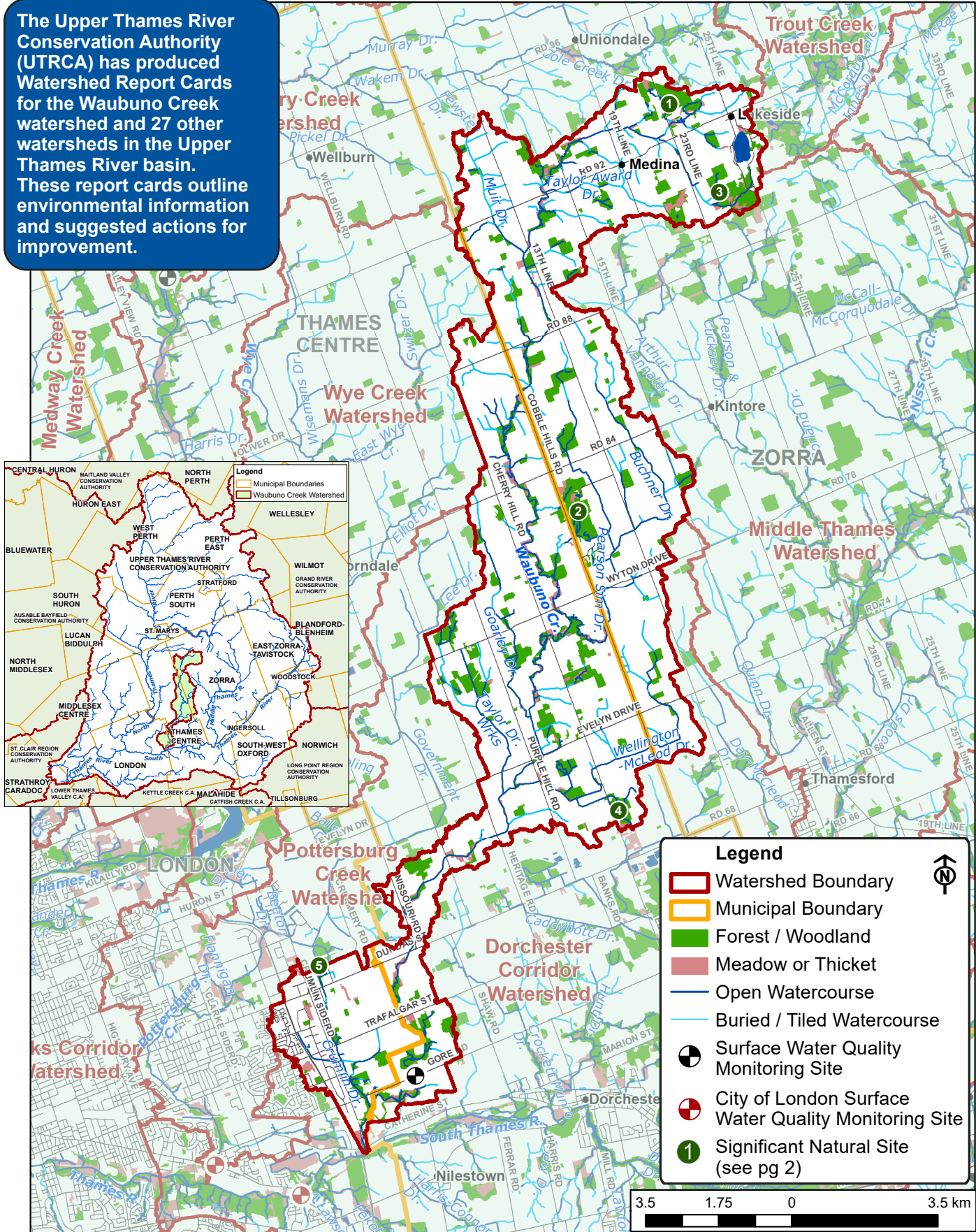


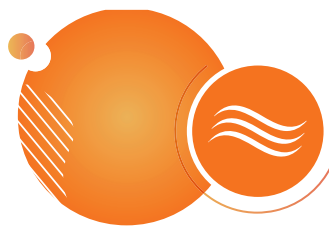
Forest Conditions
D - Steady

2022 Watershed Report Card

Waubuno Creek

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

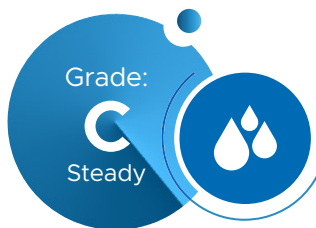




Watershed Features

Feature	Description														
Municipalities	Zorra (47%, 47 km ²), Thames Centre (43%, 43 km ²), London (9%, 9 km ²) Total Area: 9,975 ha (100 km ²), 3% of the Upper Thames River watershed.														
Significant Natural Sites	Significant Wetlands: (1) Lakeside Wildwood Complex, (2) Cobble Hills Swamp, (3) Medina Bush. Other Wetlands: (4) West Nissouri Swamp WN2D, (5) Airport Wetland. Life Science Area of Natural and Scientific Interest: (2). (See numbered sites on map. Some sites have more than one designation).														
Land Cover	77% agriculture, 15% natural vegetation, 1% open space, 7% built-up/urban, < 1% aggregates, < 1% water. There is little change from five years ago. 4% impervious cover (e.g., hard surfaces such as roads and roofs).														
Population	5,033 in 2021; a decline since 2016 largely due to watershed boundary corrections														
Soil Type	58% silty loam, 13% clay loam, 6% bottomland, 5% sandy loam, 5% not mapped (urban), 5% coarse sand, 4% very fine sand, 3% fine sandy loam, 2% silty clay loam, 1% organic														
Physiography	45% undrumlinized till plain, 22% spillway, 18% sand plain, 9% eskers, 4% kame moraine, 1% till moraine														
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	57% of the watershed has agricultural tiling (20% random + 37% systematic), 7% urban drainage, 36% no tiling. An additional 3% of the watershed is tiled compared to five years ago.														
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	195 km of watercourses 28% natural, 36% channelized, 36% buried/closed 24% cool/coldwater, 76% warmwater/unconfirmed 0.45% slope (moderately steep); range is 0.09-1.26% in Upper Thames River watershed													
Dams and Barriers	10 barriers to fish passage have been recorded in this watershed. Barriers include dams, weirs, perched culverts, beaver dams, and stormwater ponds.														
Spills	<table><tr><th>2001-2005</th><th>2006-2010</th><th>2011-2015</th><th>2016-2020</th></tr><tr><td>6</td><td>10</td><td>4</td><td>5</td></tr></table>				2001-2005	2006-2010	2011-2015	2016-2020	6	10	4	5	Recent reported spills involved fuels, industrial chemicals, and sewage.		
2001-2005	2006-2010	2011-2015	2016-2020												
6	10	4	5												
Sewage Treatment	There are no sewage treatment plants discharging into Waubuno Creek. The London portion of the watershed is serviced by the Pottersburg Wastewater Treatment Plant which discharges treated effluent to the South Thames River. All rural properties in the watershed are serviced by private septic systems.														
% Vegetation Cover and Types	Vegetation cover: Composition:	1,384 ha or 13.9% of the watershed 72% deciduous forest, 4% mixed forest, 6% plantation/coniferous forest, 14% meadow, 3% thicket													
Wetland Cover	3.7% (365 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.														
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)	114	2	284	25	84									
	Medium (10-30 ha)	27	18	496	43										
	Large (> 30 ha)	7	52	364	32										
Fish and Mussels	Fish Species: 34 including a newly historic (Blacknose Shiner). Gamefish: Smallmouth, Brown Trout, Northern Pike, and Rock Bass. Mussel Species: 8.														
Species-at-Risk	Birds: 7 species including Canada Warbler and Wood Thrush. Fish: Black Redhorse, Northern Brook Lamprey, Northern Sunfish. 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.



Surface Water Quality

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

Phosphorus levels have been steady since the last report card and remain low at just above the provincial aquatic guideline. *E. coli* bacteria levels are better than the Upper Thames River average and have remained steady.

Nitrate levels (from sources such as fertilizer) remain steady and are at two times the aquatic life guideline. Metals such as lead, copper, and zinc are at low levels, below provincial aquatic guideline. Chloride has also remained steady and well below the aquatic guideline.

Stream health, based on benthic scores, has remained steady. Much of Waubuno Creek has a fairly well vegetated buffer and some of the lower reaches flow through a relatively natural, unaltered stream channel which contributes to stream health.

Indicators	Waubuno Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.116 D	0.027 B	0.037 C	0.043 C 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	301 D	153 C	111 C	125 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)	6.15 D	5.99 D	5.63 C	5.91 D	5.96 D 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 Waubuno Creek, the Greenside Darter is one of the biggest darters at 15 cm long. It belongs to the perch family of fishes—one of the largest families in North America. It plays an important role as a host in the reproductive cycle of several freshwater mussels in their larval stage, providing them with transportation and distribution into other areas.



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 Waubuno Creek watershed have remained fairly steady since the last report card and score an overall grade of D.

The percent forest cover (11.5%) has increased slightly from 11.4% 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 2.4% cover for a total of 13.9% natural vegetation cover.

The percent forest interior (1.1%) 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 (37.9%) has increased from 33.9% in the last report card primarily due to improved mapping. Levels are below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (13.1%) for a total of 51.0% riparian zone vegetated.

Indicators	Waubuno Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	11.5 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	1.1 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	37.9 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

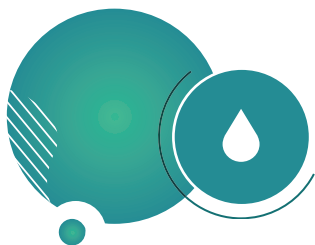
Years	ha	
2000-2006	8	Approximately 12 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 11 ha of forest were cleared in the previous 10 years.
2006-2010	3	
2010-2015	12	

Forest Area Gained

Years	ha	
2010-2015	16	New data shows that approximately 16 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.



Groundwater

Municipal Water Supply

Portions of the Waubuno Creek watershed located in London are supplied by the London municipal water system by pipeline from its sources in Lakes Huron and Erie. All other areas in the watershed are supplied by groundwater. A municipal well in Lakeside draws groundwater from a bedrock aquifer and supplies approximately 385 people. Municipal water is tested and treated.

Private Wells

Approximately 510 private wells are on record in the Waubuno 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.

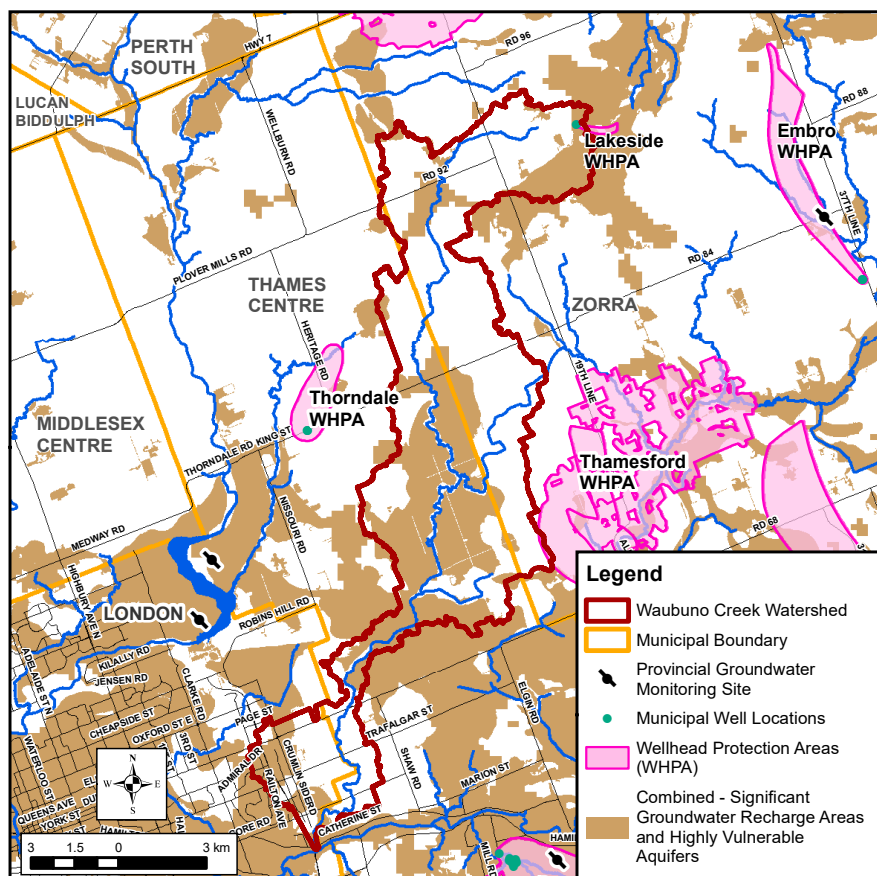
The rate of decline in groundwater levels is directly related to maximum air temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

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 Lakeside.



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:

- London Climate Emergency Action Plan or CEAP (2021/2022)
- London Wastewater Treatment Operations Master Plan (2021/2022)
- The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019)
- London Pollution Prevention and Control Plan (2018)
- Oxford Natural Heritage Systems Study (Oxford County, 2016 draft)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- The Pottersburg Creek and Crumlin Drain Subwatershed Study (Paragon Engineering, 1995)

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.
- Consider dam/barrier removal to improve stream health and fish passage, especially when a barrier no longer serves its intended purpose.
- 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 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.



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 Waubuno 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 Waubuno Creek watershed is in the Thames River watershed which is part of the Lake Erie watershed. Water from Waubuno Creek enters the South Thames River in east London 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 Zibi) 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 Waubuno 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, the interconnecting force main linking Pottersburg Wastewater Treatment Plant (WWTP) to Vauxhall WWTP was completed. The transfer pump station is currently in the design phase. These upgrades to the wastewater treatment system are made to improve efficiency and protect water quality.
- Over 2,000 trees were planted at 11 sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Through UTRCA's Communities for Nature program (2016-2020), wildflower and grass seeds were planted in a pollinator garden at 3M Canada.
- Watershed landowners completed seven Clean Water Program (CWP) projects including fragile land retirement/reforestation, wellhead protection, and septic system upgrades. Since 2001, 89 projects have been completed in this watershed.
- Two recommendations from the Oxford Natural Heritage Study (Oxford County, 2006) continue to be implemented. A Woodlands and Wetlands category was added to the CWP to fund tree planting and other woodlot management projects, and a stewardship award is given annually to recognize commitment to the environment. In 2016, the County of Oxford established a wall of fame to recognize winners of the Oxford Stewardship Award.
- The City of London has continued sewer separation of old antiquated pipes and the installation of new separated storm and sanitary sewer pipes to improve the waste water treatment system and water quality. 8 km of combined sewers have been separated, representing almost half of the 17 km target.
- A Tree Protection By-law was adopted by London City Council (2016) which implements portions of the Urban

Forest Strategy (2014) and Implementation Plan (2014). The goal is to increase tree canopy cover to 28% by 2035 and 34% by 2065.

- In 2019, London City Council declared a Climate Emergency. In response, the London Climate Emergency Action Plan or CEAP (2021/2022) was developed to reduce greenhouse gas emissions and improve resilience to climate change while listing over 200 actions for the London community to implement.
- In 2020, the City of London installed traffic bollards in and around the outlet of Waubuno Creek to prevent unauthorized off-road vehicles from damaging the stream bed. Further improvements to the parkland at the outlet (River Rd. and the South Thames River) are planned.



Waubuno Creek



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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Thames
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