



Surface Water Quality
C - Improved

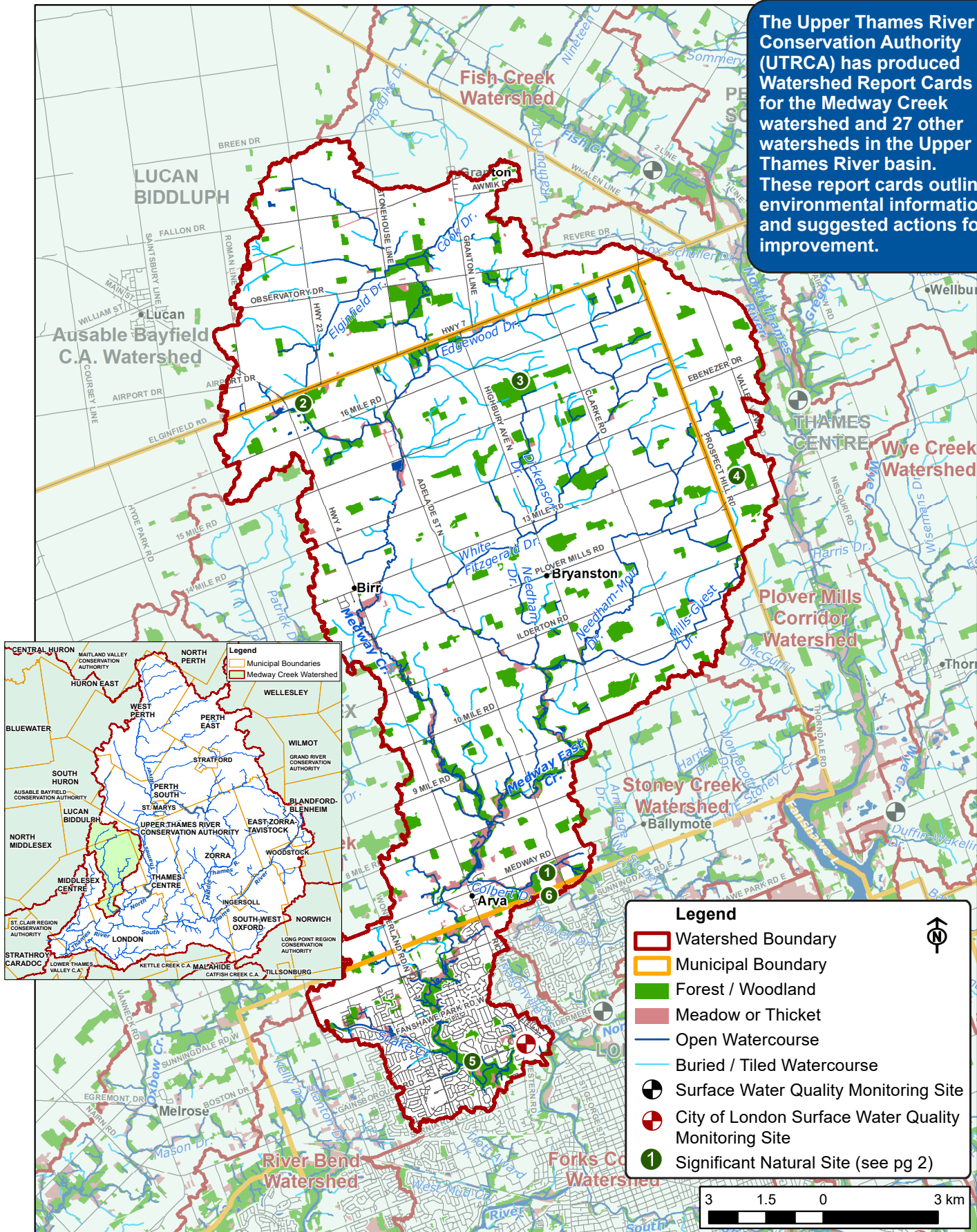


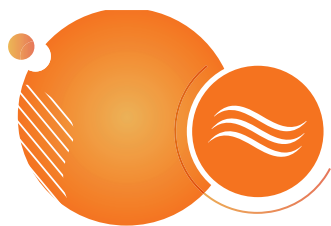
Forest Conditions
D - Slight Decline

2022 Watershed Report Card

Medway Creek

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Medway 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	Middlesex Centre (65%, 134 km²), Lucan-Biddulph (19%, 39 km²), London (9%, 19 km²), Thames Centre (6%, 13 km²). Total Area: 20,475 ha (205 km²), 6% of Upper Thames River watershed.																										
Significant Natural Sites	Significant Wetlands: (1) Arva Moraine Wetlands. Other Wetlands: (2) Elginfield Wetland, (3) Maple Grove Swamp, (4) Valleyview/Plover Mills WN18D. London Environmentally Significant Areas: (5) Medway Valley Heritage Forest ESA, (6) Arva Moraine ESA. (See numbered sites on map). Earth Science Areas of Natural and Scientific Interest: Elginfield Area Moraines.																										
Land Cover	77% agriculture, 12% natural, 2% open space, 9% built-up/urban, < 1% water, < 1% aggregates. 0.5% less agriculture and 0.8% more built-up than five years ago. 4% of the watershed is in impervious cover.																										
Population	35,028 in 2021; a 19% increase since 2016																										
Soil Type	33% clay loam, 32% silty loam, 20% silty clay loam, 6% bottomland, 6% not mapped, 3% coarse sand																										
Physiography	67% undrumlinized till plain, 16% till moraine (Arva moraine), 16% spillway																										
Soil Erosion/ Delivery	5% 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	63% of the watershed has agricultural field tile (22% systematic + 41% random), 9% urban drainage, 28% no tiling. 3% more urban drainage than five years ago.																										
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	298 km of watercourses 25% natural, 38% channelized, 37% buried/closed 24% cool/coldwater, 75% warmwater/unconfirmed 0.27% slope (low/flat); range is 0.09-1.26% in Upper Thames River watersheds																									
Dams and Barriers	43 barriers to fish passage have been recorded including one public dam (St. John’s Estate dam/barrier). Barriers include dams, weirs, perched culverts, debris blockages, beaver dams, and stormwater ponds.																										
Spills	<table><tr><td>2001-2005</td><td>2006-2010</td><td>2011-2015</td><td>2016-2020</td></tr><tr><td>10</td><td>19</td><td>14</td><td>10</td></tr></table>				2001-2005	2006-2010	2011-2015	2016-2020	10	19	14	10	Recent reported spills involved fuels, industrial chemicals, and manure.														
2001-2005	2006-2010	2011-2015	2016-2020																								
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Sewage Treatment	The Granton Wastewater Treatment Plant (WWTP) discharges treated effluent into Medway Creek. The portion of the watershed within London is serviced by the Adelaide WWTP (discharges treated effluent to the North Thames River) and the Greenway WWTP (discharges into the Thames River). All rural properties in the watershed are serviced by private septic systems.																										
% Vegetation Cover and Types	Vegetation cover: Composition:	2,351 ha or 11.5% of the Medway watershed 74% deciduous forest, 4% mixed forest, 3% plantation/coniferous forest, 17% meadow, 3% thicket																									
Wetland Cover	3.9% (798 ha) of the watershed is in wetland cover. Wetlands make up 34% of the natural vegetation cover. 8.3 ha of wetland cover were lost between 2010 and 2015.																										
Woodlot or Patch Size	<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>185</td><td>3</td><td>609</td><td>32</td><td rowspan="3">108</td></tr><tr><td>Medium (10-30 ha)</td><td>37</td><td>16</td><td>607</td><td>32</td></tr><tr><td>Large (> 30 ha)</td><td>13</td><td>52</td><td>676</td><td>36</td></tr></table>					Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)	Small (< 10 ha)	185	3	609	32	108	Medium (10-30 ha)	37	16	607	32	Large (> 30 ha)	13	52	676	36
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Fish and Mussels	Fish Species: 54 species Gamefish: Smallmouth and Largemouth Bass, Northern Pike, Walleye, and Rainbow Trout Mussel Species: 14 (out of 30 recorded in Upper Thames watershed)																										
Species-at-Risk	Birds - 15 species including Bank Swallow, Wood Thrush. Fish - Black Redhorse, Northern Sunfish, Silver Shiner. Insects - Monarch. Mussels - Kidneyshell, Rainbow, Wavy-rayed Lampmussel. Plants - 4 species including False Rue-anemone, Green Dragon. Reptiles - 5 species including Midland Painted Turtle and Spiny Softshell.																										

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 Medway Creek has improved from an overall D grade to a C since the last report card based on data at the downstream monitoring station at Windermere Road. The UTRCA has a water quality target of a B grade for Medway Creek by 2037.

Phosphorus concentrations have shown continuous improvement over the long term and have been steady since 2015 with current levels lower than the Upper Thames River average. Bacteria (*E. coli*) levels have improved since the 1980s and have remained steady in recent years, currently at levels below the Upper Thames River average. Chloride levels (mainly from road salt) have shown an increasing

trend since the 1990s but remain below the aquatic life guideline. Nitrate levels (sources such as fertilizer and waste) have been decreasing since the mid-1990s but are still mainly above the provincial aquatic guideline.

Medway Creek water quality/stream health as indicated by benthic sampling has been fairly consistent at or near the Upper Thames River average since 1997. Sampling throughout the watershed indicated conditions were fairly degraded in the headwaters, slightly improved in the middle reaches, and moderately impaired in the lower extents in London.

Indicators	Medway Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996- 2000	2001- 2005	2006- 2010	2011- 2015	2016- 2020			
Phosphorus (mg/l) *	0.170 D	0.155 D	0.120 D	0.070 D	0.059 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) **	246 C	157 C	184 C	174 C	157 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)	5.76 D	6.20 D	5.87 D	5.99 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, City of London monitoring data. **Geometric mean, City of London 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.

The Wavyrayed Lampmussel, found in Medway Creek, spends part of its life cycle attached to the gills of its host species, Largemouth or Smallmouth Bass. This mussel has an appendage that resembles a small minnow. When the bass grabs this "lure," the mussel ejects its larvae onto the fish's gills.



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 Medway Creek watershed have declined slightly since the last watershed report card in 2017, and score an overall grade of D. It should be noted that some of the change is due to improved mapping methods and boundary corrections.

The percent forest cover (9.2%) has decreased slightly from 9.4% in the last report card. The Environment Canada (EC) guideline for sustaining species and water quality in southern Ontario is 30% forest cover. Meadows and thickets add an additional 2.2% for a total of 11.5% natural cover.

The percent forest interior is very low (0.9%), indicating most woodlots are too small and/or narrow to support area sensitive birds such as Scarlet Tanager and Ovenbird. The EC guideline for southern Ontario is 10% forest interior.

The percent riparian zone forested (29.3%) has increased slightly from 28.7% in the last report cards, but is below the guideline of 50%. Additional riparian areas are in permanent meadows (16.0%) for a total of 45.2% riparian zone vegetated.

Indicators	Medway Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	9.2 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	29.3 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	47	Approximately 40 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 59 ha of forest were cleared in the previous 10 years.
2006-2010	12	
2010-2015	40	

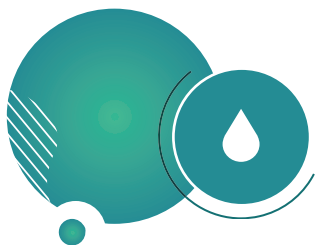
Forest Area Gained

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.



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



Municipal Water Supply

The portions of the Medway Creek watershed within London and Arva are supplied by the London municipal water system pipeline from its source in Lakes Huron and Lake Erie. All other areas in the watershed are supplied by groundwater. The community of Birr is supplied by a municipal well that draws groundwater from an overburden aquifer rather than bedrock. Municipal water is tested and treated.

Private Wells

Approximately 1,125 private wells are on record in the Medway Creek watershed with the majority drawing groundwater from overburden aquifers. Properly constructed deep wells have a lower risk of contamination from the surface when compared to 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

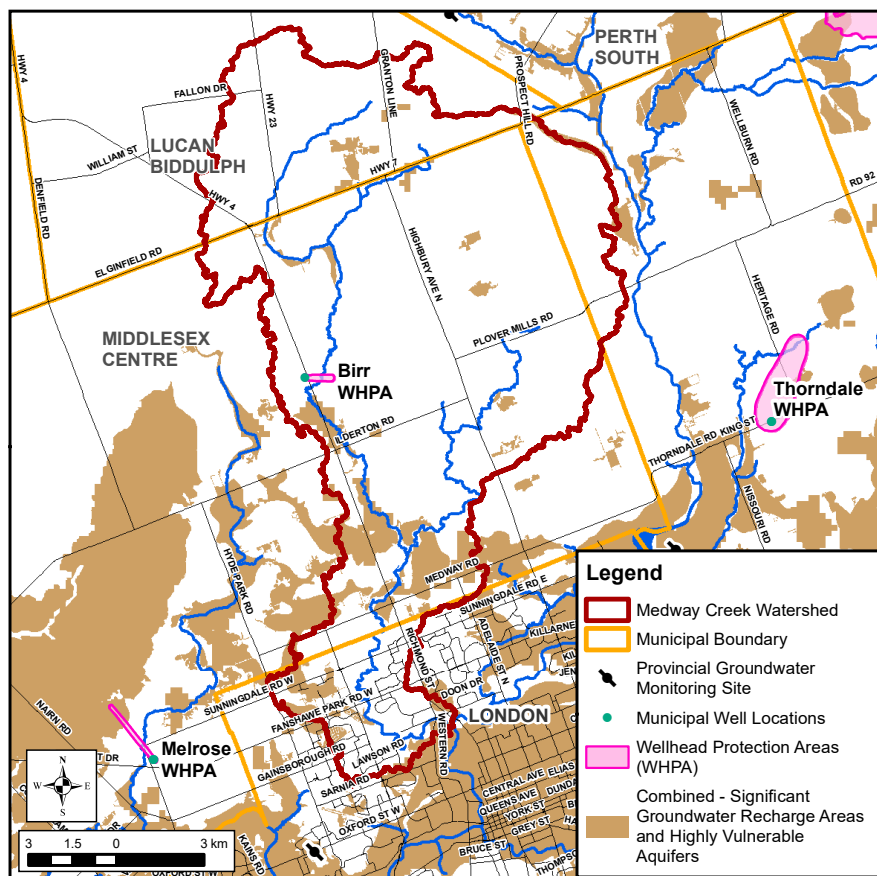
data shows the recharge period is shifting later to November to May, with a trend of warmer and drier weather from October to November and cooler temperatures in May. The rate of decline in groundwater levels is directly related to maximum air temperatures. Summer rainfall does not typically affect groundwater 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 a Water Supply System Summary for Birr.



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 Wastewater Treatment Operations Master Plan (2021/2022)
- London Climate Emergency Action Plan, or 'CEAP' (2021/2022)
- London Environmental Review Policy (2021)
- The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019)
- London Pollution Prevention & Control Plan (2018)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- Medway Creek Community-Based Enhancement Strategy (Friends of Medway Creek and UTRCA, 2009)

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.
- Medway Creek has 43 dams/barriers. Evaluate their role, function, and aquatic habitat impacts. 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 urban areas, continue the following actions:
 - For new development, implement urban stormwater planning using Low Impact Development (LID), stormwater BMP, 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).
- 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 Medway Creek and its tributaries.
- Increase natural vegetation cover in urban areas by targeting the naturalization of manicured parks and open spaces, river valleys, residential and industrial areas, school yards, and through urban planning and design.
- 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.
- Connect isolated 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.
- 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 Medway Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from Medway Creek enters the North Thames River in London and takes 4-10 days to flow through London and Chatham, and then 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 Medway 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 2015, the Upper Medway Creek was chosen as a Priority Subwatershed Project, initiated by the UTRCA as part of the Ontario Ministry of Agriculture, Food, and Rural Affairs Great Lakes Agricultural Stewardship initiative. The project assessed the impact of intensive adoption of BMPs (e.g., cover crops) on water quality. The goal was to reduce soil and phosphorus losses from agricultural fields into watercourses.
- From 2016-2020, landowners completed 17 Clean Water Program (CWP) projects such as fragile land retirement/reforestation, erosion control measures, and wellhead protection.
- More than 10,900 trees were planted at 18 sites through the UTRCA's Private Land Reforestation Program from 2016-2020.
- 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.
- The Friends of Medway have helped plant over 7,340 trees and shrubs at 12 sites along the creek and between woodlots for a total of 10 ha restored. This work was done through the UTRCA's Communities for Nature Program with the help of 2,460 students and 185 community members.
- The UTRCA continues to manage the Medway Valley Heritage Forest Environmentally Significant Area under contract with the City of London. Recent projects include trail maintenance and invasive species removal to protect rare flowers. A Conservation Master Plan was completed and implementation of the recommendations has begun including trail realignment and planting vegetation to prevent encroachment, and erosion control.
- The City of London has made advancements in forestry policies including a new private Tree Protection By-law (2021), Tree Planting Strategy (2017-2021), and others. The TreeMe grant program for planting trees on private lands was also expanded. The City has set a goal of increasing canopy cover to 28% by 2035 and 34% by 2065. Note: tree canopy cover is different from forest cover as tree canopy includes street and yard trees.
- Greenway Wastewater Treatment Plant (WWTP) completed a significant three year expansion project in 2018 to increase treatment capacity by 12%. Vauxhall WWTP constructed and completed a vegetated berm and effluent pumping station in 2020 for flood protection.
- London has continued sewer separation of old antiquated pipes and the installation of separated storm and sanitary sewer pipes. 8.1 km (47.6% of 17 km) of combined sewers have been separated. The City has plans to complete the separation of an additional 4.2 km of combined sewer by the end of 2025.
- Through the UTRCA's Communities for Nature Program, over 8,600 trees, 100 wildflowers and grasses, and 1,100 aquatic plants were planted at 13 locations by 2,670 students and 270 community volunteers.



Cover crops in the Upper Medway Creek watershed



Trees and shrubs planted by the Friends of Medway



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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