



Surface Water Quality
C - Improved



Forest Conditions
D - Slight Improvement

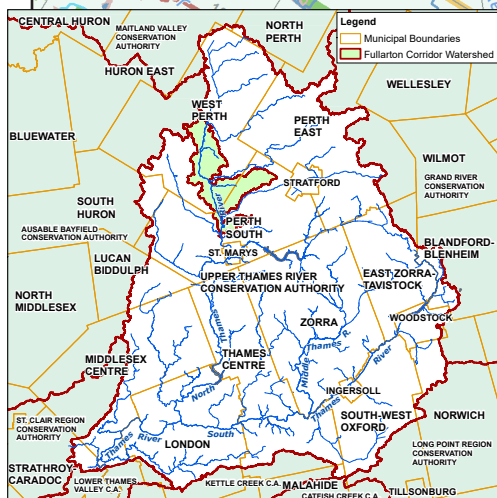
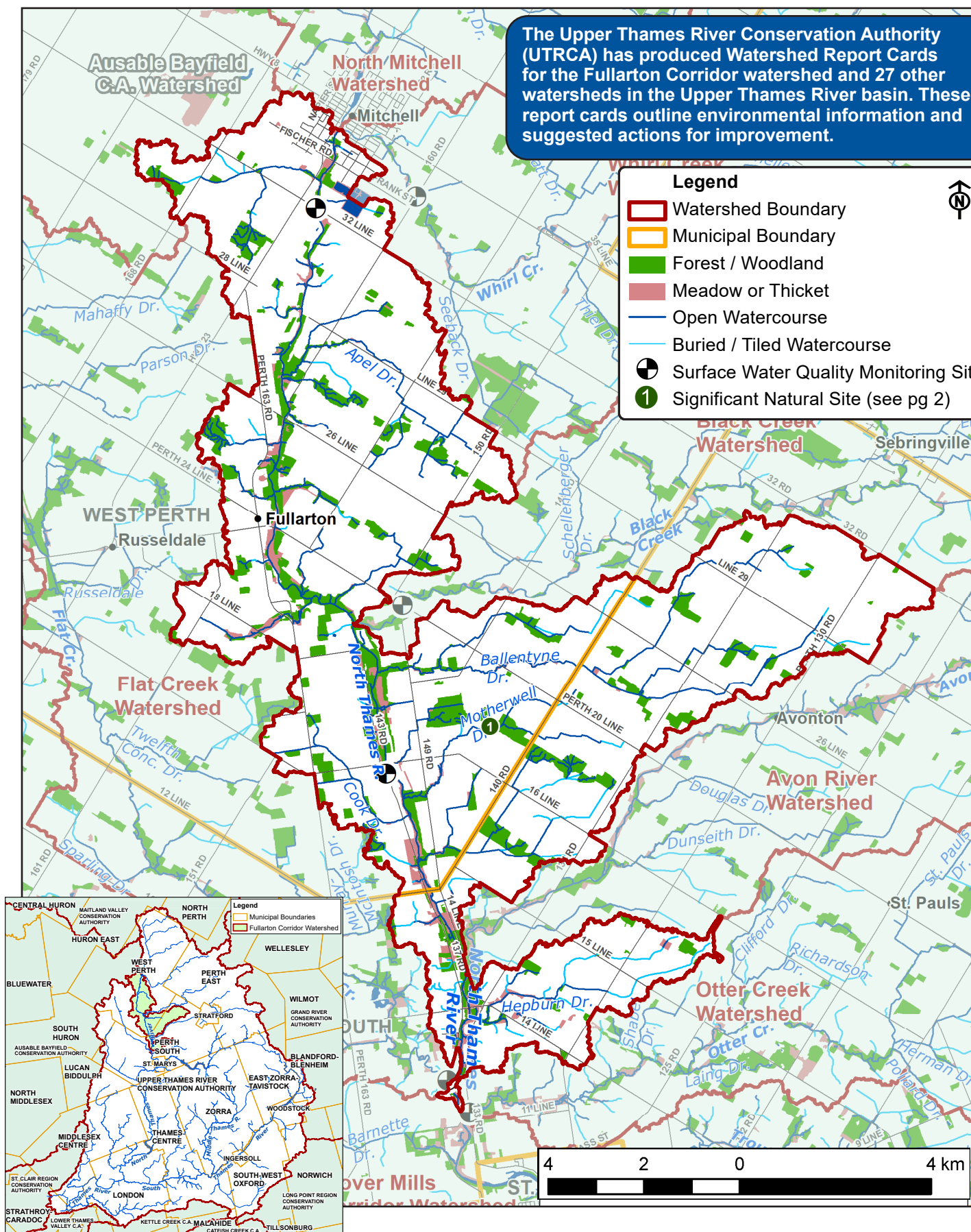
2022 Watershed Report Card

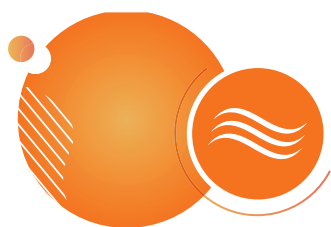
Fullarton

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

Legend

- Watershed Boundary
- Municipal Boundary
- Forest / Woodland
- Meadow or Thicket
- Open Watercourse
- Buried / Tiled Watercourse
- Surface Water Quality Monitoring Site
- Significant Natural Site (see pg 2)





Watershed Features

Feature	Description																										
Municipalities	West Perth (64%, 76 km²), Perth South (36%, 42 km²). Total area: 11,777 ha (118 km²), 3% of the Upper Thames River watershed. 815 km² lies upstream.																										
Significant Natural Sites	Wetlands: (1) Motherwell Blue Heron Swamp. (See numbered site on map). Earth Science Areas of Natural and Scientific Interest: Fullarton Moraine, North Thames Valley.																										
Land Cover	82% agriculture, 12% natural vegetation, 1% open space, 4% urban, < 1% aggregates, 1% water. 2% of the watershed is in impervious cover (e.g., hard surfaces such as roofs and roads).																										
Population	1,723 in 2021; a 16% increase since 2016, partly due to watershed boundary corrections.																										
Soil Type	50% silty loam, 39% clay loam, 8% bottomland, 2% loam, 1% not mapped/urban																										
Physiography	71% undrumlinized till plain, 17% spillway, 12% till moraine																										
Soil Erosion/Delivery	13% 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	72% of the watershed has agricultural field tile (21% random + 51% systematic), 4% urban drainage, 24% no tiling. There has been very little change over the last five years.																										
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	189 km of watercourses 40% natural, 42% channelized, 18% buried/closed 21% cool/coldwater, 79% warmwater/unconfirmed 0.26% slope (low/flat) for North Thames, 0.35% slope (moderate) for McEwan and 20th Con. Dr.; range is 0.09-1.26% in Upper Thames River watersheds																									
Dams and Barriers	9 barriers to fish passage have been recorded including the Fullarton Conservation Area Dam and other smaller perched culverts, beaver dams, etc.																										
Spills	<table><tr><td>2001-2005</td><td>2006-2010</td><td>2011-2015</td><td>2016-2020</td></tr><tr><td>1</td><td>3</td><td>1</td><td>1</td></tr></table>				2001-2005	2006-2010	2011-2015	2016-2020	1	3	1	1	Recent reported spill involved an industrial chemical.														
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Sewage Treatment	The Mitchell Wastewater Treatment Plant services the Town of Mitchell and discharges treated effluent to the North Thames River just downstream of Mitchell. All other homes and businesses in the watershed are serviced by private septic systems.																										
% Vegetation Cover and Types	Vegetation cover: Composition:	1,425 ha or 12.1% of the Fullarton Corridor watershed 69% deciduous forest, 3% mixed forest, 9% plantation/coniferous forest, 15% meadow, 4% thicket																									
Wetland Cover	3.3% (388 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. No wetland cover was 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>121</td><td>3</td><td>351</td><td>30</td><td rowspan="3">157</td></tr><tr><td>Medium (10-30 ha)</td><td>16</td><td>19</td><td>299</td><td>26</td></tr><tr><td>Large (> 30 ha)</td><td>9</td><td>57</td><td>510</td><td>44</td></tr></table>					Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)	Small (< 10 ha)	121	3	351	30	157	Medium (10-30 ha)	16	19	299	26	Large (> 30 ha)	9	57	510	44
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Fish and Mussels	Fish Species: 48 species including 3 with only historic records Gamefish: Smallmouth and Largemouth Bass, and Northern Pike Mussel Species: 13 species																										
Species-at-Risk	Birds: 10 species including Barn Swallow and Wood Thrush Fish: 3 species including Black Redhorse and Silver Shiner Insect: Monarch Mussels: Rainbow and Wavy-rayed Lampmussel Reptiles: Snapping Turtle and Midland Painted Turtle Plants: Kentucky Coffee-tree																										

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

Fullarton Corridor has improved since the last report card and scores an overall grade of C. The surface water quality of the watershed is monitored at the downstream end on the North Thames River at Perth Line 12 (see map). The UTRCA has a water quality target of a B grade for Fullarton Corridor by 2037.

Phosphorus levels have improved since 2015 and are much lower than the Upper Thames River average. Bacteria (*E. coli*) levels are low and better than the Upper Thames River average. Recent chloride levels (mainly from road

salt) are low, and below the aquatic life guideline. Recent nitrate levels are mostly above the aquatic guideline. General improvements in water quality are seen at this site compared to an upstream monitoring site at Line 32, south of Mitchell. A healthy, natural river channel running through this area is helping to improve water quality.

Stream health or water quality, as indicated by benthic score from the North Thames site near Science Hill, continued to show slight improvement.

Indicators	Fullarton Corridor					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	No data	0.060 C	0.135 D	0.053 C 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 <i>E. coli</i> / 100 ml) **	No data	No data	84 B	157 C	128 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)	5.79 D	5.82 D	5.62 C	5.38 C	5.34 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, UTRCA data. **Geometric mean, Health Unit data. Province-wide grading system used (see page 8). In 2019, the Provincial Recreational Guideline for *E. coli* changed from 100 Colony Forming Units *E. coli* / 100 ml to 200 CFU *E. coli* / 100 ml.

Found in the Fullarton Corridor watershed, the Mottled Sculpin is a common inhabitant of spring-fed streams. It has a large mouth and can eat prey items almost as large as itself. It has been driven out of many of its habitats by the invasive Round Goby.



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 Fullarton Corridor watershed have improved slightly since the last watershed report cards 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 (9.8%) has increased slightly from 9.4% five years ago primarily due to improved mapping and succession (see table). The Environment Canada (EC) guideline for southern Ontario is a minimum of 30% forest cover. Meadows and thickets add another 2.3% cover for a total of 12.1% natural vegetation cover.

The percent forest interior (0.7%) is very low, indicating most woodlots are too small and narrow to support area sensitive species such as Scarlet Tanager and Ovenbird. The EC guideline is 10% forest interior.

The percent riparian zone forested (37.4%) has increased from 28.3% in 2016, primarily due to mapping improvements. Levels are still below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thickets (12.4%) for a total of 49.8% riparian zone vegetated. The North Thames River is well-vegetated in this area, unlike the tributary watercourses and drains.

Indicators	Fullarton Corridor 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	9.8 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	37.4 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

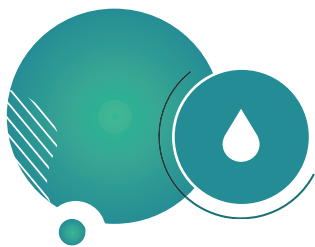
Years	ha	
2000-2006	3	Approximately 3 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 3-4 ha of forest were cleared in the previous 10 years.
2006-2010	<1	
2010-2015	3	

Forest Area Gained

Years	ha	
2010-2015	62	New data shows that approximately 62 ha of forest were gained between 2010 and 2015 due to forest succession and improved mapping. Several 20- to 30-year-old tree planting sites and some thickets matured to the point where they could be classified as mature woodland in 2015. This data demonstrates the value of continued tree planting and conservation efforts.



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



Groundwater

Municipal Water Supply

The Town of Mitchell has 4 municipal wells which draw groundwater from a deep bedrock aquifer, and supply water to 4870 people. Municipal well water is tested and treated.

Private Wells

Approximately 270 private wells are on record in this watershed, the majority drawing from bedrock 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

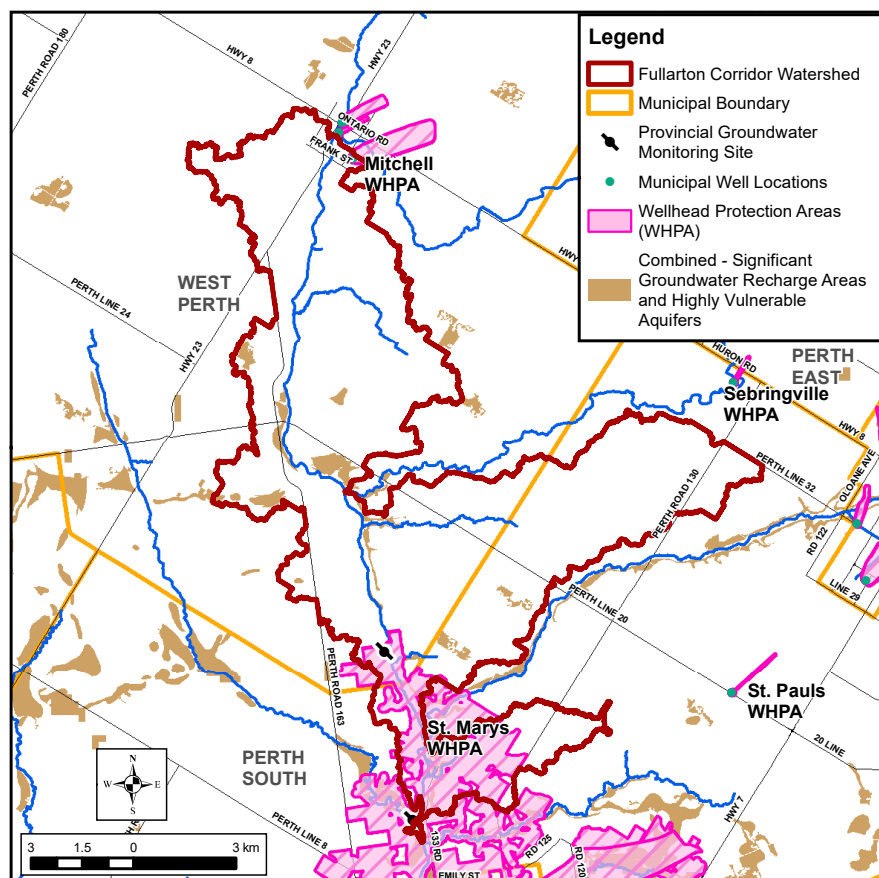
typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

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 Mitchell.



On The Map

Significant Groundwater Recharge

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

Highly Vulnerable Aquifers:

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

Wellhead Protection Areas:

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

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



Local Actions for Improvement

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

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

- The Thames River (Deshkan Zibi) Shared Waters Approach to Water Quality and Quantity (Thames River Clearwater Revival, 2019),
- 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), and
- 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.
- Assess the purpose of eight dams/barriers in Fullarton Corridor to determine if any should be removed or modified to improve river health and fish passage. At least two watercourses, Hepburn Drain and Neil Drain, have coldwater habitat that may be suitable for Brook Trout introduction if the barriers are removed or mitigated.
- 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):
 - 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 Mitchell, 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.



Blocks of trees are planted using a machine planter in a prepared field.

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 Forest and Vegetation Cover

- Connect the existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along the North Thames 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.
- Connect isolated woodlots by planting shelterbelts, windbreaks, and buffers along fields and watercourses, which will also protect against soil erosion and improve water quality. Thin older, denser windbreaks.
- 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 Fullarton Corridor is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the Fullarton Corridor (North Thames River) 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 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.





Highlights of Progress Since 2017

The Fullarton Corridor 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 species. The goal is to increase local tree and leaf cover.
- Many municipalities in the Upper Thames watershed are taking action on climate change. For Perth County municipalities, there is a shared Climate Change Coordinator. There is 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.
- Perth County contracted the UTRCA to complete the Perth County Natural Heritage Systems Study (Perth County, 2018 and 2019) to identify existing important natural heritage features on the landscape.
- Over 5,035 trees were planted at 16 properties from 2016 to 2020 under the UTRCA's Private Land Reforestation Program. Trees were planted into windbreaks, along watercourses, and in block plantings to enlarge existing woodlots or create new woodlots.
- Under the UTRCA's Communities for Nature Program, 100 trees were planted by 30 students at the Mitchell Wetlands.
- Watershed landowners completed 10 Clean Water Program projects from 2016 to 2020 including fragile land retirement and erosion control measures. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (www.cleanwaterprogram.ca). From 2001 to 2020, 82 projects were completed.

- Local volunteers continue to improve this stretch of the North Thames River through the annual Thames River Cleanup that started in 2000. Each spring, volunteers remove garbage and litter from the river and its banks.



Perth South Tree Power 2021



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
Canadian Heritage River