



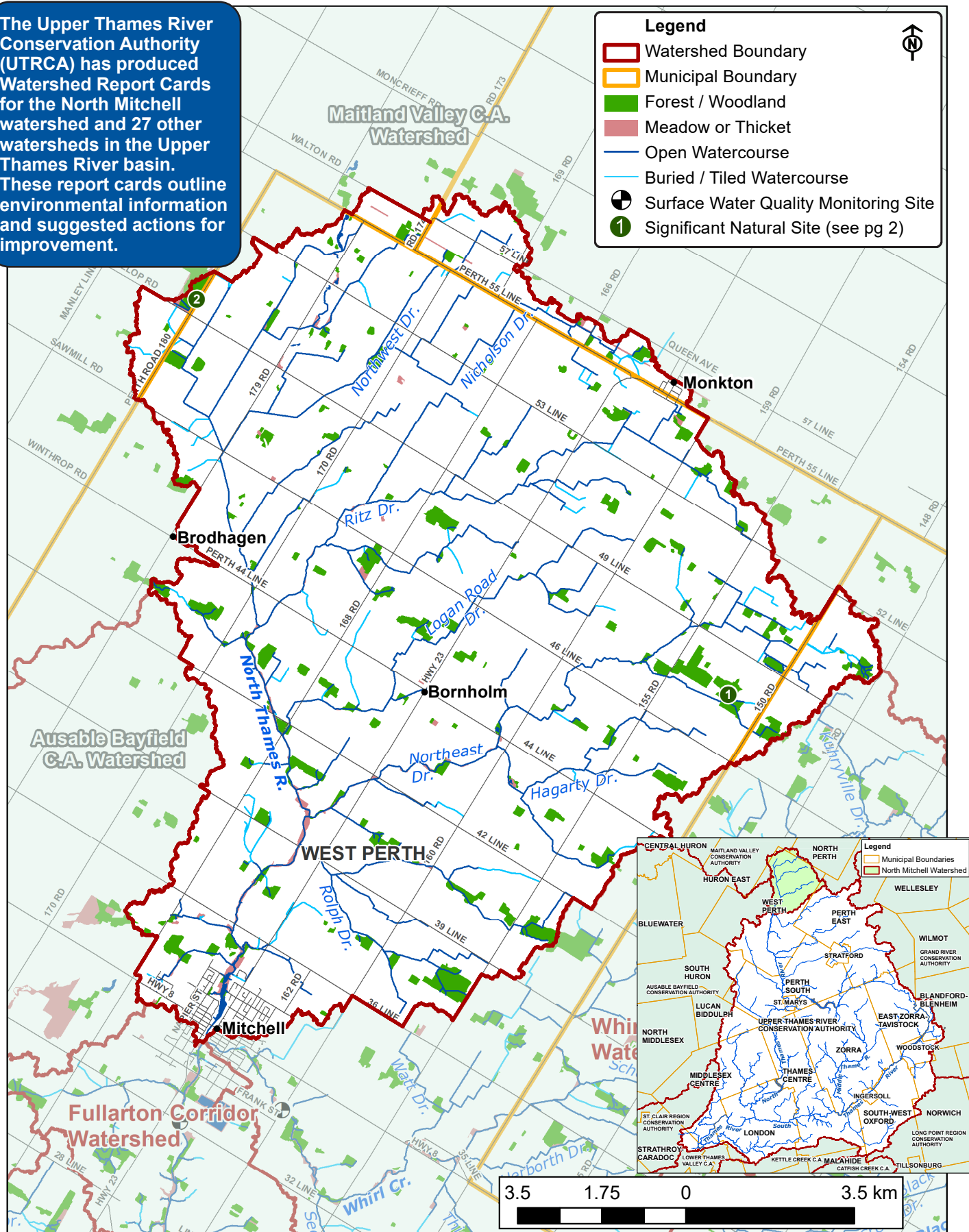
Surface Water Quality
D - Steady

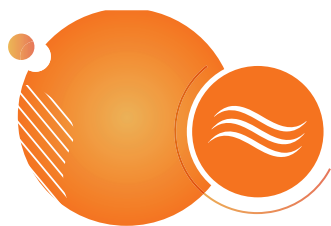


Forest Conditions
F - Steady

2022 Watershed Report Card North Mitchell

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the North Mitchell 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	West Perth (93%, 161 km²), North Perth (2%, 4 km²), Perth East (3%, 5 km²), Huron East (2%, 3 km²) Total Area: 17,307 ha (173 km²), 5% of Upper Thames River watershed																										
Significant Natural Sites	Wetlands: (1) Kuhryville Wetland Complex, (2) McKillop Northeast Wetland. (See numbered sites on map).																										
Land Cover	89% agriculture, 6% natural vegetation, 1% open space, 4% urban, < 1% aggregates, < 1% water. Approximately 2% of the watershed is in impervious cover.																										
Population	4,685 in 2021; a slight decline since 2016 that may be due to watershed boundary corrections																										
Soil Type	93% clay loam, 3% bottomland, 2% organic, 1% silty loam																										
Physiography	46% undrumlinized till plain, 37% drumlinized till plain, 8% till moraine, 5% spillway, 3% clay plain, 1% eskers																										
Soil Erosion/Delivery	1% 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	65% of the watershed has agricultural tile (7% random + 58% systematic), 4% urban drainage, and 31% no tiling. There is 5% more tiling/drainage compared to five years ago.																										
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	235 km of watercourses 5% natural, 79% channelized, 16% buried/closed 18% cool/coldwater, 82% warmwater/unconfirmed 0.12% slope (very flat) on North Thames River. Range is 0.09-1.26% in the Upper Thames River watershed.																									
Dams and Barriers	Five barriers to fish passage have been recorded including the Mitchell Conservation Area dam. Barriers include dams, weirs, stormwater ponds, perched culverts, debris blockages, and beaver dams.																										
Spills	<table><tr><th>2001-2005</th><th>2006-2010</th><th>2011-2015</th><th>2016-2020</th></tr><tr><td>3</td><td>11</td><td>7</td><td>0</td></tr></table>					2001-2005	2006-2010	2011-2015	2016-2020	3	11	7	0														
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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 this watershed. All other homes and businesses in the watershed are serviced by private septic systems.																										
% Vegetation Cover and Types	Vegetation cover: Composition:	934 ha or 5.4% of the North Mitchell watershed 80% deciduous forest, 6% mixed forest, 1% plantation/coniferous forest, 11% meadow, 2% thicket																									
Wetland Cover	2.7% (467 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 0.5 ha of 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>146</td><td>3</td><td>425</td><td>53</td><td rowspan="3">43</td></tr><tr><td>Medium (10-30 ha)</td><td>18</td><td>17</td><td>299</td><td>37</td></tr><tr><td>Large (> 30 ha)</td><td>2</td><td>42</td><td>84</td><td>10</td></tr></table>					Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)	Small (< 10 ha)	146	3	425	53	43	Medium (10-30 ha)	18	17	299	37	Large (> 30 ha)	2	42	84	10
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Fish and Mussels	Fish species - 29 species including a historic species. Gamefish species - Smallmouth Bass. Mussel species - 9 species including 5 historic records.																										
Species-at-Risk	Birds - 8 species including Bobolink and Chimney Swift. Fish - Northern Sunfish. Mussels - Rainbow (one historical record). Reptiles - Midland Painted Turtle, Snapping Turtle.																										

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 remained steady in the North Mitchell watershed since the last report card, and scores an overall grade of D. The UTRCA has a water quality target of a C grade for the North Mitchell watershed by 2037.

Since long-term monitoring began on the North Thames River (just below Mitchell) in the early 1970s, phosphorus levels have been elevated. Since the last report card, phosphorus levels have shown some increase. Fecal bacteria (*E. coli*) levels have improved since 2000 and are

similar to the Upper Thames River average. Nitrate levels (from sources such as fertilizer) have increased gradually over the long term and remain at levels above the provincial aquatic guideline. Chloride levels (mainly from road salt) have increased over the years but remain below aquatic life guidelines. Metals such as lead, copper, and zinc have decreased over the long term, and are now at low levels.

Based on benthic sampling, stream health or water quality has remained steady since the last reporting period.

Indicators	North Mitchell					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	0.127 D	0.169 D	0.165 D	0.144 D	0.180 D Declined	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) **	407 D	394 D	252 C	256 C	223 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)	6.02 D	6.48 D	6.28 D	5.79 D	5.92 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 the North Mitchell watershed, Rock Bass use chemical signals to communicate and perceive their environment. This ability helps them locate their prey, and to identify opposite sexes and predators. They can change their colours quickly to match their surroundings, helping them avoid predators. Rock Bass are one of the few local fish with red eyes, which may help them see better at night.



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.



2022 Watershed Report Card

Forest Conditions

Forest conditions in the North Mitchell watershed have been fairly steady since the last report card, and score an overall grade of F. It should be noted that some of the change is due to improved mapping methods and boundary corrections.

The percent forest cover (4.7%) increased slightly from 4.6% in 2017, primarily due to improved mapping and some natural succession (see Forest Area Gained table). These levels are the lowest in the Upper Thames River watershed. The Environment Canada (EC) guideline for sustaining native species and water quality in southern Ontario is 30% forest cover. Meadows and thickets add another 0.7% cover for a total of 5.4% natural vegetation cover.

The percent forest interior (0.4%) is extremely low, indicating the majority of 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 (12%) has increased from 7.5% in the last report card, primarily due to improved mapping. Levels are well below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (6.2%) for a total of 18.2% vegetated riparian zone.

Indicators	North Mitchell 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	4.7 F	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	0.4 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	12.0 F	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

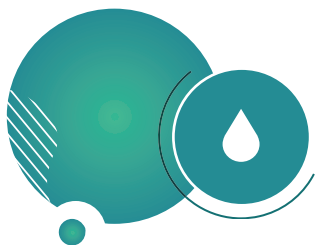
Years	ha	
2000-2006	4	Approximately 3 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 6 ha of forest were cleared in the previous 10 years.
2006-2010	2	
2010-2015	3	

Forest Area Gained

Years	ha	
2010-2015	12	New data shows that approximately 12 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.



Great-crested Flycatchers nest locally in tree cavities in mature forests. Photo: Sharon Nethercott



Groundwater

Municipal Water Supply

The Town of Mitchell has four municipal wells which draw groundwater from a deep bedrock aquifer, and supply water to approximately 4,870 people. Municipal well water is tested and treated.

Private Wells

Approximately 400 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 than shallow wells. The highest risk to a well is from contaminants and activities closest to the well. The safety, testing, and treatment of a private well are the responsibility of the well owner.

Groundwater Monitoring

The Provincial Groundwater Monitoring Network has shown groundwater levels 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

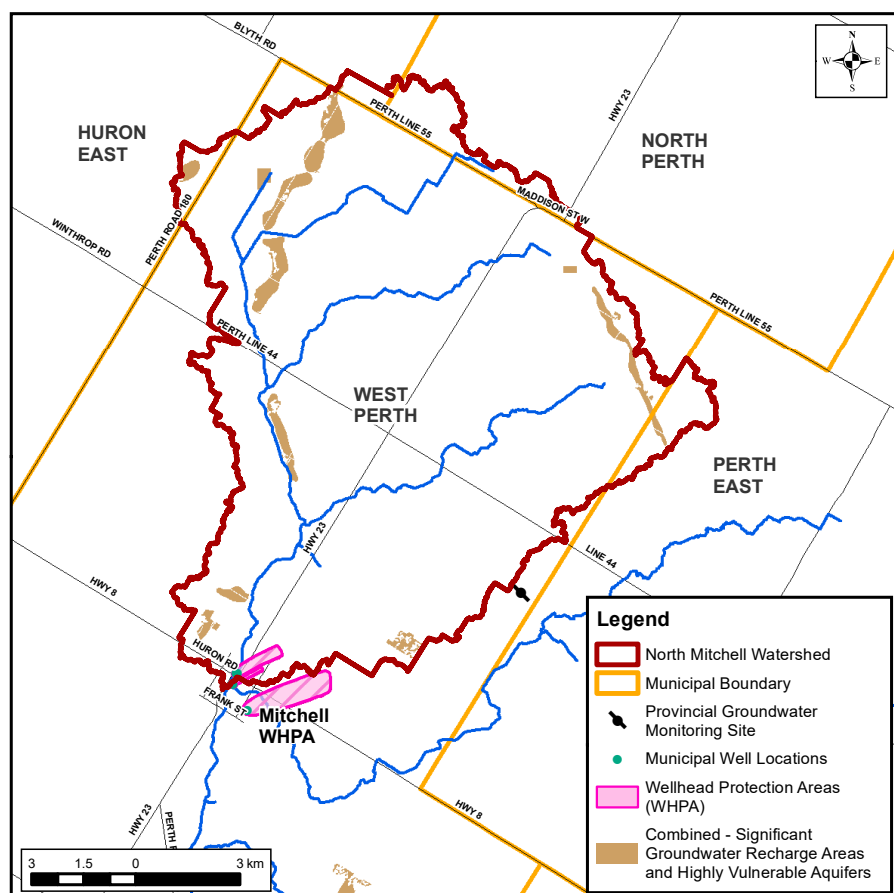
to maximum air temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

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

Local Actions to Improve Surface Water and Groundwater

- The North Mitchell watershed has the lowest amount of stream-side vegetation cover in the Upper Thames River watershed. 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.
- Continue to naturalize the area along and immediately downstream of the Mitchell Reservoir to improve water quality protection (plant tall vegetation to discourage the presence of geese).
- Protect and establish buffers (native trees, grasses) along watercourses to cool streams, provide food for aquatic species, stabilize banks, and trap and absorb nutrients and other pollutants.
- Use drain maintenance methods that protect aquatic habitat (e.g., low flow channels, spot or bottom cleanouts).
- Repair or replace faulty septic systems and ensure proper maintenance of the system.
- 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 Mitchell, 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.



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

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 the North Thames River 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 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 North Mitchell watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the North Mitchell watershed flows down the North Thames River 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 North Mitchell 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:

- The UTRCA hosted its annual Rural Landowner Workshop in West Perth in 2018 and 2019 with presentations on cover crops, windbreaks, soil improvement, and the new UTRCA-owned property, the Cade Tract.
- Perth County contracted the UTRCA to complete the Perth County Natural Heritage Systems Study (Perth County, 2018 and 2019) to identify existing natural heritage features on the landscape.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. Perth County municipalities share a 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.
- Over 1,400 trees were planted at nine sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Watershed landowners completed seven Clean Water Program (CWP) projects involving fragile land retirement/reforestation. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (www.cleanwaterprogram.ca). Since 2001, 61 projects have been completed.
- The Municipality of West Perth is examining potential future upgrades at the Mitchell Wastewater Treatment Plant to improve performance and water quality.
- West Perth Thames Nature Trail and Wetlands continues to be promoted and improved, as initiated by the Energy & Environment Committee of the Municipality of West Perth and other partners (www.westperth.com). Ducks Unlimited Canada and local partners have worked to convert the old

Mitchell sewage lagoons to wetland habitat through water level manipulation and wetland plant seeding. These wetlands provide much needed habitat for waterfowl, sandpipers, and other water birds.

- Under the UTRCA's Communities for Nature Program, 100 trees were planted by 30 students at Mitchell Wetlands.
- The annual West Perth Spring Clean-up is held on Earth Day. Volunteers from the community remove debris from the river and its banks as well as around the entire municipality.



In 2021, the UTRCA and the Municipality of West Perth worked together on a Vegetation Management Plan for the Mitchell Dam and Reservoir. The plan entails monitoring vegetation decomposition and water quality.



In 2019, the UTRCA worked with the Municipality of West Perth to remove Japanese Knotweed, an invasive non-native plant, from parkland along the Thames River in Mitchell.



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