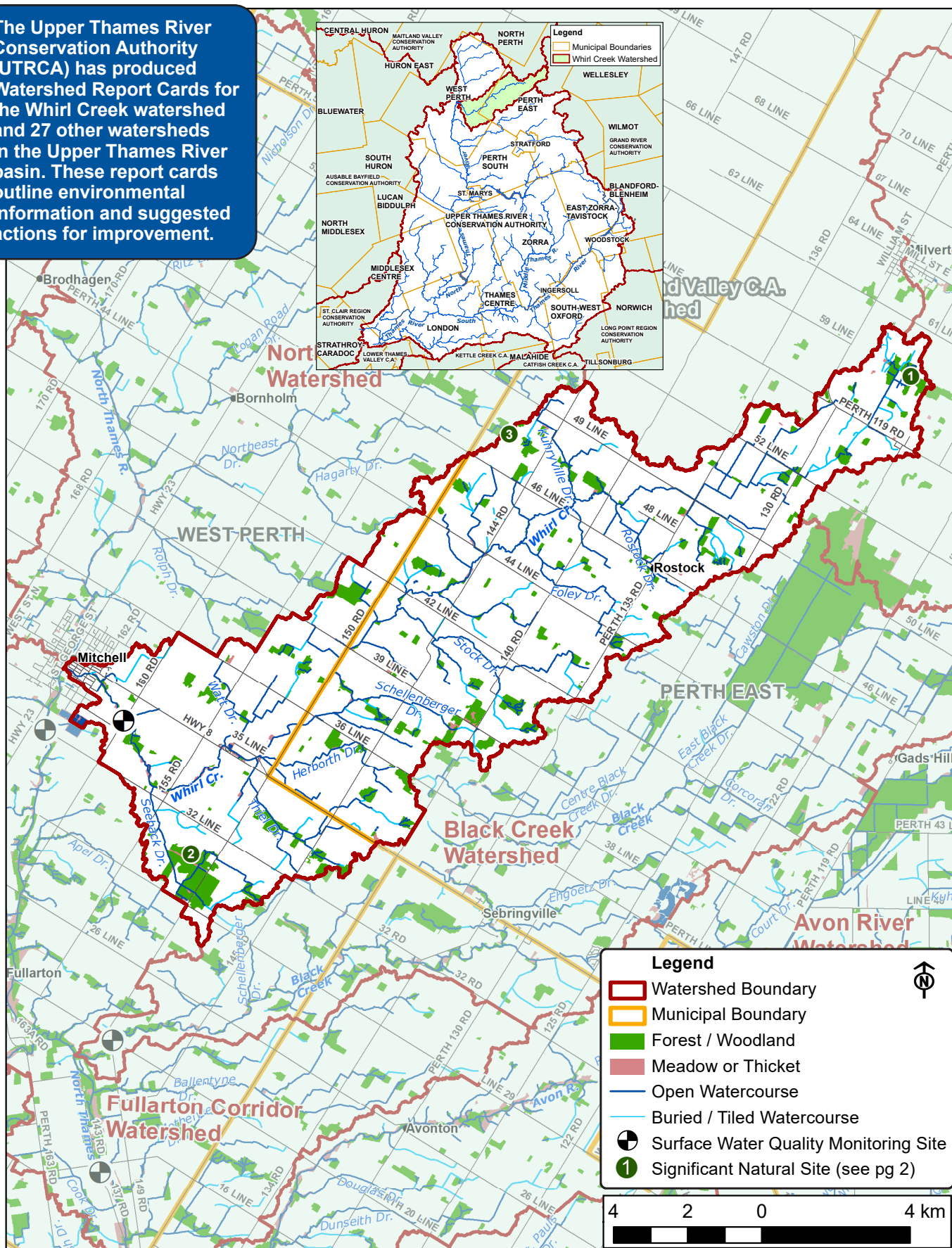


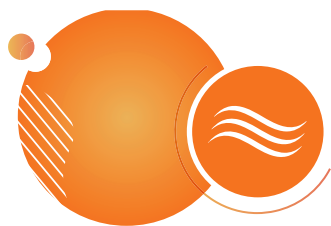


2022 Watershed Report Card

# Whirl Creek

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

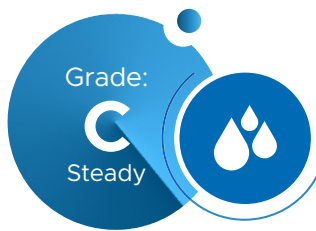




# Watershed Features

| Feature                      | Description  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
|------------------------------|--|--|-------------------|--------------------------|--------------------|----------------------|-----------|-----------|---|---|---|---|--|--|--|
| Municipalities               | Perth East (69%, 90 km²), West Perth (33%, 43 km²)<br>Total Area: 13,309 ha (133 km²), 4% of Upper Thames River watershed  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Significant Natural Sites    | Wetlands: (1) Brunner Complex, (2) Whirl Creek Woods, (3) Kuhryville Complex. (See numbered sites on map). Earth Science Areas of Natural and Scientific Interest: Brunner Spillway.   |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Land Cover                   | 87% agriculture, 8% natural vegetation, 0% open space, 4% built-up/urban, < 1% water, < 1% aggregates. There has been little change from five years ago. 2% impervious cover (e.g., hard surfaces such as roofs and roads).  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Population                   | 2,148 in 2021; a 6% increase since 2016, partly due to watershed boundary corrections  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Soil Type                    | 78% clay loam, 14% silty loam, 8% bottomland   |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Physiography                 | 83% undrumlinized till plain, 17% till moraine   |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| 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          | 66% of the watershed has agricultural field tile (22% random + 44% systematic), 4% urban drainage, 30% no tiling. An additional 2% of the watershed is tiled/drained compared to five years ago.   |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Watercourse Characteristics  | Total length:<br>Watercourse type:<br>Temperature:<br>Main channel slope:  | 206 km of watercourses<br>12% natural, 64% channelized, 24% buried/closed<br>16% cool/coldwater, 84% warmwater/unconfirmed<br>0.18% slope (very flat); range is 0.09-1.26% in Upper Thames River watershed |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Dams and Barriers            | One barrier to fish movement has been documented in this watershed. Barriers can include dams, weirs, stormwater ponds, 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>2</td><td>7</td><td>3</td><td>4</td></tr></table>  |  |                   |                          | 2001-2005          | 2006-2010            | 2011-2015 | 2016-2020 | 2 | 7 | 3 | 4 | Most recent spills involved industrial chemicals and manure. |  |  |
| 2001-2005                    | 2006-2010  | 2011-2015  | 2016-2020         |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| 2                            | 7  | 3  | 4                 |                          |                    |                      |           |           |   |   |   |   |  |  |  |
|                              |  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Sewage Treatment             | There are no sewage treatment plants discharging into Whirl Creek. Areas within Mitchell are serviced by the Mitchell Wastewater Treatment Plant which discharges treated effluent to the North Thames River. Rural residences are serviced by private septic systems. |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| % Vegetation Cover and Types | Vegetation cover:<br>Composition:  | 1,062 ha or 8% of the watershed<br>77% deciduous forest, 10% mixed forest, 2% plantation/coniferous forest, 9% meadow, 2% thicket  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Wetland Cover                | 3.6% (474 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)  | 110  | 3                 | 301                      | 32                 | 108                  |           |           |   |   |   |   |  |  |  |
|                              | Medium (10-30 ha)  | 26   | 16                | 410                      | 43                 |                      |           |           |   |   |   |   |  |  |  |
|                              | Large (> 30 ha)  | 4  | 60                | 240                      | 25                 |                      |           |           |   |   |   |   |  |  |  |
| Fish and Mussels             | Fish species: 35<br>Gamefish: Smallmouth Bass, Northern Pike, and Rock Bass<br>Mussel species: 10  |  |                   |                          |                    |                      |           |           |   |   |   |   |  |  |  |
| Species-at-Risk              | Birds: 10 species including Bobolink and Wood Thrush<br>Fish: Northern Sunfish and Silver Shiner<br>Mussels: Rainbow<br>Reptiles: 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](http://www.thamesriver.on.ca).



# Surface Water Quality

Surface water quality has remained steady in Whirl Creek since the last report card and scores an overall grade of C. The water quality monitoring station is at Perth County Road 160, and was added in 2010 (see map). The UTRCA has a water quality target of a C grade for Whirl Creek by 2037.

Phosphorus levels have improved since the last reporting period. They are above provincial guidelines but better than the Upper Thames River average. Bacteria (*E.coli*) levels have been steady over the past five years and are better than the Upper Thames River average.

Chloride levels (mainly from road salt) are low, and well below the aquatic life guideline.

Stream health or water quality as indicated by benthic sampling has remained steady since the last reporting period.

| Indicators                                       | Whirl Creek |           |            |            |                                 | Upper Thames<br>2016-2020 | Provincial<br>Guideline    | Indicator Description  |
|--|-------------|-----------|------------|------------|---------------------------------|---------------------------|----------------------------|--|
|  | 1996-2000   | 2001-2005 | 2006-2010  | 2011-2015  | 2016-2020                       |                           |                            |  |
| <b>Phosphorus (mg/l) *</b>                       | No data     | No data   | 0.084<br>D | 0.120<br>D | <b>0.081<br/>D<br/>Improved</b> | 0.110<br>D                | 0.030<br>B<br>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.  |
| <b>Bacteria (CFU <i>E. coli</i> / 100 ml) **</b> | No data     | No data   | 153<br>C   | 238<br>C   | <b>193<br/>C<br/>Steady</b>     | 211<br>C                  | 200<br>C<br>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.   |
| <b>Benthic Score (FBI)</b>                       | 6.36<br>D   | 6.04<br>D | 5.81<br>D  | 5.67<br>C  | <b>5.69<br/>C<br/>Steady</b>    | 5.99<br>D                 | < 5.00<br>B<br>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 Whirl Creek, the Stonecat is the largest of the madtoms in Canada. Like all catfish, Madtoms have smooth skin (rather than scales) covered with taste receptors that help them locate food by detecting minute amounts of proteins in the water. Many of these taste receptors are located on the catfish's "whiskers" (barbels). Since the Stonecat is intolerant of pollution, its presence is an indicator of good water quality.



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 Whirl Creek watershed have improved slightly since the last report card 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 (7.2%) has increased from 6.7% in the last report card primarily due to improved mapping and some natural succession (see Forest Area Gained table). 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 0.8% cover for a total of 8% 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 for southern Ontario is 10% forest interior.

The percent riparian zone forested (18.6%) has increased from 9.3% in the last report card, primarily due to improved mapping. However, levels are still well below the guideline of 50%. Additional riparian areas are in permanent meadows and thicket (5.9%) for a total of 24.5% riparian zone vegetated.

| Indicators               | Whirl Creek 2022* | Upper Thames Average 2022* | EC Guideline ** | Indicator Description  |
|--------------------------|-------------------|----------------------------|-----------------|--|
| % Forest Cover           | 7.2<br>D          | 11.3<br>D                  | 30.0<br>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<br>F          | 1.5<br>F                   | 10.0<br>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 | 18.6<br>D         | 35.7<br>C                  | 50.0<br>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

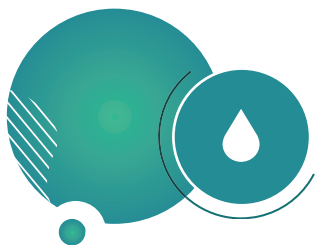
| Years     | ha |  |
|-----------|----|--|
| 2000-2006 | 6  | Approximately 1 ha of forest was cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 8 ha of forest were cleared in the previous 10 years. |
| 2006-2010 | 2  |  |
| 2010-2015 | 1  |  |

### Forest Area Gained

| Years     | ha |  |
|-----------|----|--|
| 2010-2015 | 11 | New data shows that approximately 11 ha of forest were gained between 2010 and 2015 due to forest succession and improved mapping. Several 20- to 30-year-old tree planting sites and some thickets matured to the point where they could be classified as mature forests in 2015. This data demonstrates the value of continued tree planting and conservation efforts. |



Hairy Woodpeckers nest locally in tree cavities, often in more mature forests. Photo: Brenda Gallagher



# Groundwater

## Municipal Water Supply

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

## Private Wells

Approximately 340 private wells are on record in this watershed with 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 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

Since 2003, the UTRCA has monitored one Provincial Groundwater Monitoring Network well in the Whirl Creek watershed. It has shown that 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

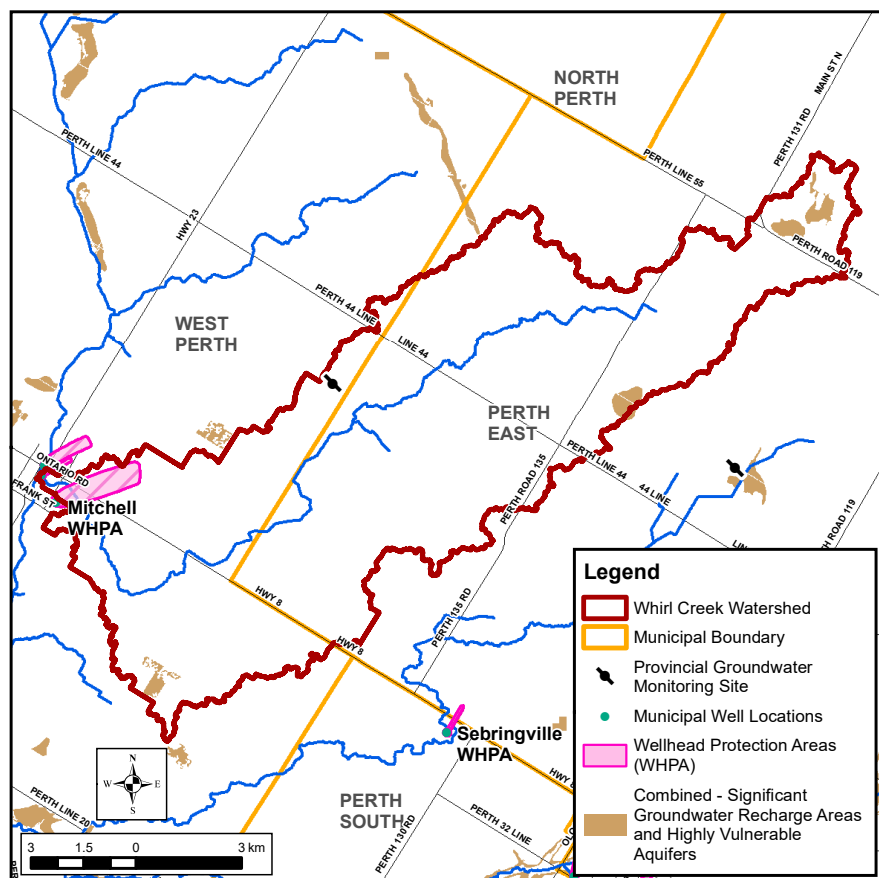
temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

### 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](http://www.sourcewaterprotection.on.ca) for information on groundwater resources, Source Protection Plan policies, and the 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

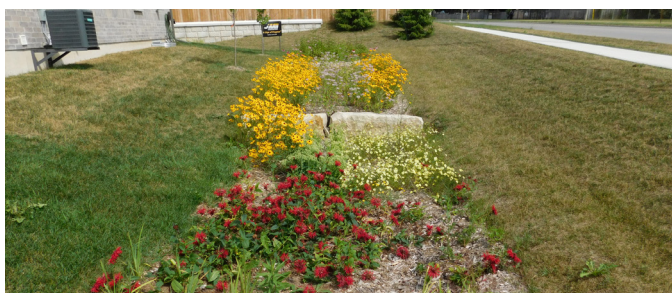
Individuals, groups, businesses, municipalities, and agencies all have a role in improving the health of the watershed through these suggested actions. For more information on agencies that can help, contact the UTRCA (see page 8).

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, 2017 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

- Whirl Creek currently has the second lowest percentage of streamside vegetation cover in the Upper Thames River watershed. Improving this vegetation cover would benefit the health of the creek. Plant buffers (native trees, grasses) along Whirl Creek and its tributaries 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](http://www.omafra.gov.on.ca)).
  - Utilize grants for stewardship work from the UTRCA Clean Water Program ([www.cleanwaterprogram.ca](http://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.



Low Impact Development techniques such as rain gardens help reduce stormwater runoff to local streams in developed areas.



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](http://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](http://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 Whirl 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 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](http://ontarioinvasiveplants.ca), [thamesriver.on.ca](http://thamesriver.on.ca)). Keeping out livestock and unauthorized motorized vehicles also protects habitat quality.

## Great Lakes Connection

The Whirl Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from Whirl Creek enters the North Thames River at Mitchell and takes 4-10 days to flow through London, Chatham, and into Lake St. Clair. About two weeks later, it reaches Lake Erie via the Detroit River.

## Shared Waters Approach

In 2012, partners in the Thames River watershed formed the Thames River Clear Water Revival to work together on the protection of water, with the shared goal of a healthy and vital Thames River which would also benefit Lake St. Clair and Lake Erie. This partnership brings together Indigenous peoples, three levels of government, two local conservation authorities, and the local community. A state of the environment report with a focus on actions needed for water quantity and quality was completed in 2019: The Thames River (Deshkan Ziibi) Shared Waters Approach to Water Quality and Quantity. Implementation by all partners is underway. The Shared Waters Approach contains significant input from four of the eight distinct First Nations whose traditional territory includes the Thames River watershed and highlights the positive participation and sharing of traditional ecological knowledge within this approach.





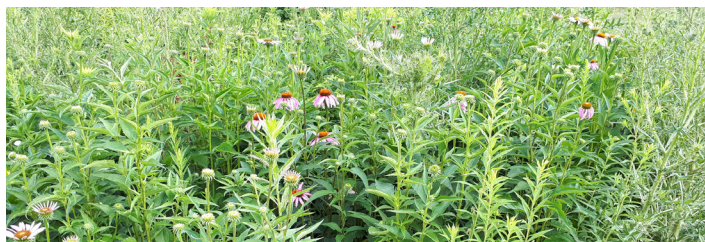
## Highlights of Progress Since 2017

The Whirl 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:

- Hosted by the UTRCA, the annual Rural Landowner Workshop in West Perth offers presentations on soil improvement, tree planting and windbreaks, wetland restoration, cover crops, and grants available for landowners. In 2019, the workshop drew a crowd of more than 125 landowners.
- Local students from Mitchell District High School and Upper Thames Public School helped plant 150 native trees and shrubs at Husky Flats, a site along Whirl Creek. Efforts to naturalize and create a buffer at this site have continued over the past several years.
- Streamside tree and shrub plantings in the lower reaches of Whirl Creek have grown well over the last 15 years. The vegetation is benefiting the aquatic habitat in that section of creek.
- In 2019, students from Upper Thames Public School in Mitchell planted almost 1,400 wildflowers to create pollinator habitat (photos below).
- Many municipalities in the Upper Thames River watershed are taking action on climate change. For instance, Perth County municipalities share a Climate Change Coordinator. There is also 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.
- Through UTRCA's Communities for Nature program (2016-2020), 55 community members helped plant 300 trees for TD Tree Days.
- The municipality is currently planning future upgrades of the Mitchell Wastewater Treatment Plant.
- Watershed landowners completed six Clean Water Program (CWP) projects including fragile land retirement/ reforestation and erosion control measures. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (see [www.cleanwaterprogram.ca](http://www.cleanwaterprogram.ca)). Since 2001, 41 projects have been completed in this watershed.
- Over 4,170 trees were planted at nine sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020. Some windbreak tree plantings use plastic mulch to increase growth, reduce maintenance, and suppress weeds (photo below).



Students planting a pollinator garden.



The pollinator garden thriving.



Planting trees into black plastic mulch.



### 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](http://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](http://thamesriver.on.ca)).

### For more information, contact:

**Upper Thames River Conservation Authority**  
1424 Clarke Road, London, Ontario, Canada N5V 5B9  
519-451-2800  
[info@thamesriver.on.ca](mailto:info@thamesriver.on.ca)  
[www.thamesriver.on.ca](http://www.thamesriver.on.ca)



Thames  
Canadian Heritage River