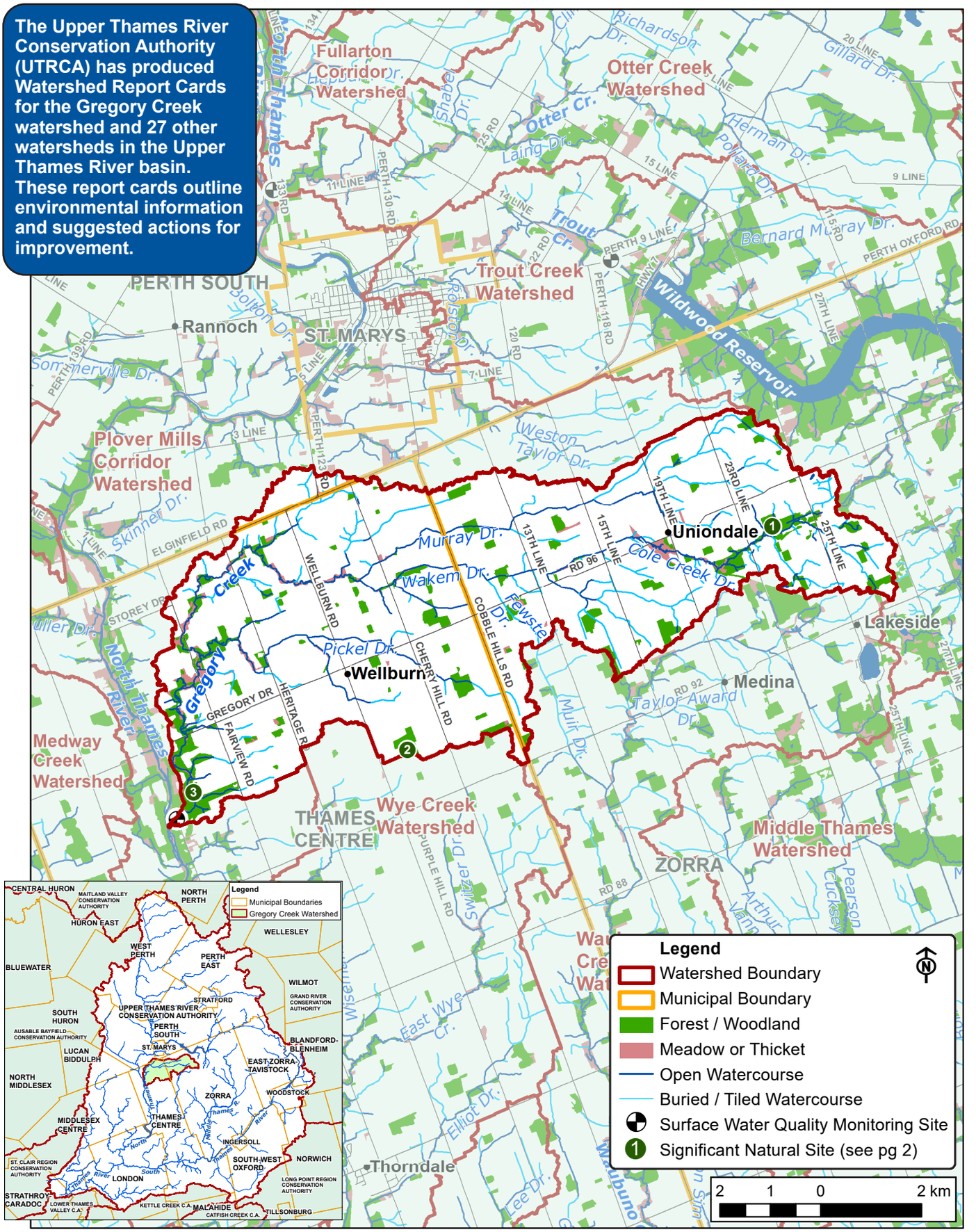
Surface Water Quality
D - Declined

Forest Conditions
D - Steady

2022 Watershed Report Card

Gregory Creek

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



2022 Watershed Report Card

Watershed Features

Feature	Description
Municipalities	Thames Centre (52%, 31 km^2), Zorra (47%, 28 km^2), Perth South (2%, 1 km^2) Total Area: 5,995 ha (60 km^2), 2% of Upper Thames River watershed
Significant Natural Sites	Significant Wetlands: (1) Lakeside Wildwood Complex. Other Wetlands: (2) Belton Wellburn Wetland WN10D. Life Science Areas of Natural and Scientific Interest: (3) St. Ives River Valley. (See numbered sites on map).
Land Cover	86% agriculture, 10% natural vegetation, 0% open space, 3% urban/built-up, < 1% aggregates, < 1% water. 2% in impervious cover (e.g., hard surfaces such as roofs and roads).
Population	687 in 2021; little change since 2016
Soil Type	41% silty loam, 28% clay loam, 21% silt clay loam, 6% bottomland, 2% organic, 1% coarse sand, 1% sandy loam
Physiography	89% undrumlinized till plain, 6% till moraine, 3% eskers, 2% spillway
Soil Erosion/ Delivery	6% highly erodible (lands that could potentially contribute > 7 tonnes/ha/yr of soil to a watercourse). The average for the Upper Thames River watershed is 9%.
Tiling and Drainage	63% of the watershed has agricultural field tile (25% random + 38% systematic), 3% urban drainage, 34% no tiling. An additional 2% of the watershed is tiled compared to five years ago.
Watercourse Characteristics	Total length: 127 km of watercourses Watercourse type: 24% natural, 25% channelized, 51% buried/closed Temperature: 5% coldwater, 33% warmwater, 62% unconfirmed Main channel slope: 0.62% slope (high/steep); range is 0.09-1.26% in Upper Thames River watershed.
Dams and Barriers	Four dams or barriers to fish passage are reported in this watershed, mostly small features such as perched culverts and beaver dams.
Spills	2001-2005: 1 2006-2010: 2 2011-2015: 2 2016-2020: 0
Sewage Treatment	There are no sewage treatment plants discharging into Gregory Creek. Properties in the watershed are serviced by private septic systems.
% Vegetation Cover and Types	Vegetation cover: 587 ha or 9.8% of the watershed Composition: 68% deciduous forest, 5% mixed forest, 7% plantation/coniferous forest, 16% meadow, 4% thicket
Wetland Cover	2.3% of the watershed (135 ha) is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover.1.4 ha of wetland cover was lost between 2010 and 2015.
Woodlot or Patch Size	See table below
Fish and Mussels	Fish Species: 31 species including a newly recorded species (Rainbow Darter) Gamefish: Smallmouth and Largemouth Bass, and BrookTrout Mussel Species: 1 (Giant Floater)
Species-at-Risk	Birds: 6 species including Bank Swallow, Eastern Wood-pewee, and Wood Thrush Fish: Northern Sunfish

Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)
Small (< 10 ha)	79	3	211	45	90
Medium (10-30 ha)	9	15	136	39	
Large (> 30 ha)	2	61	123	26	

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.

2022 Watershed Report Card

Surface Water Quality

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

Phosphorus levels have increased since 2015. Fecal bacteria (*E. coli*) levels scored a C grade and are at a level similar to the Upper Thames River average. Recent nitrate levels (from sources such as fertilizer and waste) are above the guideline for aquatic life. Since 2000, chloride levels (mainly from road salt) remain well below the aquatic life guideline.

Water quality, based on benthic scores, have improved and then declined with each new version of the report card. The current report card shows a decline since the last five year period, but benthic scores in Gregory Creek are still slightly better than Upper Thames River average.

Indicators	Gregory Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.067 D	0.047 C	0.086 D	**0.121 C 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 *E. coli*/ 100 ml) **	No data	155 C	133 C	162 C	**211 C Steady**	211 C	200 C Recreation	*E. coli* is a fecal coliform bacteria found in human and animal (livestock/ wildlife/pets) waste. *E. coli* is a strong indicator of the potential to have other disease-causing organisms in the water.
Benthic Score (FBI)	5.84 D	5.46 C	6.03 D	5.49 C	**5.87 D Declined**	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 Gregory Creek, the Northern Redbelly Dace is one of the most colourful minnows in the Thames River watershed. Their colours are more intense during spawning, when they release a small numbers of eggs at a time over several months in summer.

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.

Grade: D Steady

2022 Watershed Report Card

Forest Conditions

Forest conditions in the Gregory Creek watershed have been fairly steady 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 (7.8%) is unchanged since the last report card. The Environment Canada (EC) guideline for sustaining species and water quality in southern Ontario is minimum of 30% forest cover. Meadows and thickets add another 2% cover for a total of 9.8% natural vegetation cover.

The percent forest interior (0.3%) 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 (29%) has increased slightly from 28.2% in the last report card, primarily due to improved mapping. Levels are still below the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (15.7%) for a total of 44.7% riparian zone vegetated.

Indicators	Gregory Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	**7.8 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	**0.3 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	**29.0 C**	35.7 C	50.0 B	Percent riparian zone forested is a measure of the amount of forest cover within a 30 m riparian/buffer zone adjacent to all open watercourses. Riparian habitats support high numbers of wildlife species and provide an array of ecological functions including water quality protection.

* 2022 report card data is based on 2015 colour air photography. ** EC Guideline - Environment Canada guideline based on “How much habitat is enough?” 2013. Grades based on Conservation Ontario (2022).

Losses and Gains

Forest Area Removed

Years	ha
2000-2006	8
2006-2010	2
2010-2015	7

Approximately 7 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 10 ha of forest were cleared in the previous 10 years.

Forest Area Gained

Years	ha
2010-2015	14

New data shows that approximately 14 ha of forest were gained between 2010 and 2015 due to forest succession and improved mapping. Several 20- to 30-year-old tree planting sites and some thickets matured to the point where they could be classified as mature woodland in 2015. This data demonstrates the value of continued tree planting and conservation efforts.

White-breasted Nuthatches nest locally in tree cavities in deciduous and mixed woodlands. Photo: Sharon Nethercott.

Groundwater

Private Wells

Groundwater is the source of all drinking water in the Gregory Creek watershed. Approximately 230 private wells are on record in the Gregory Creek watershed, drawing from both bedrock and 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

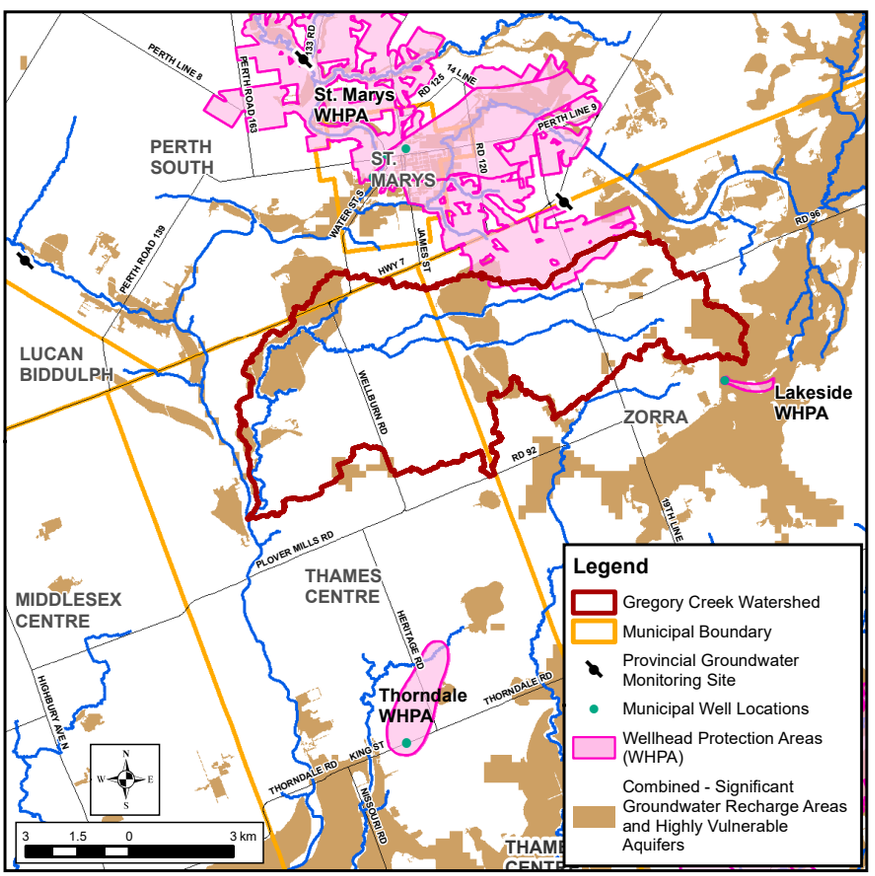
The Provincial Groundwater Monitoring Network has shown groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). Recent data shows the recharge period is shifting later to November to May, 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 and Source Protection Plan policies



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.

2022 Watershed Report Card

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)
- Oxford Natural Heritage System Study (County of Oxford, 2016 draft)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- 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.
- 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).
- Adhere to Ontario's Cosmetic Pesticide Ban and utilize the municipal hazardous waste disposal program.

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.

Planting trees as part of the UTRCA's Private Land Reforestation Program

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 Gregory Creek 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.

A machine planter is used to plant blocks of trees into a prepared field.

Great Lakes Connection

Gregory Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from Gregory Creek enters the North Thames 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.

2022 Watershed Report Card

Highlights of Progress Since 2017

The Gregory 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:

- 3,970 trees were planted at 11 properties under the UTRCA's Private Land Reforestation Program from 2016 to 2020. Trees are planted into windbreaks, along streams, and into block plantings to enlarge existing woodlots or create new woodlots.
- Watershed landowners completed 11 Clean Water Program (CWP) projects including fragile land retirement, erosion control measures, and decommissioning unused wells. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (www.cleanwaterprogram.ca). Since 2001, 65 CWP projects have been completed in the Gregory Creek watershed.
- Two recommendations from the Oxford Natural Heritage Study (Oxford County 2006) continue to be implemented. One involves a Woodlands and Wetlands category being added to the CWP to fund tree planting and other woodlot management projects. The other recommendation includes a stewardship award being given annually to recognize commitment to the environment. In 2016, the County of Oxford established a wall of fame to recognize winners of the Oxford Stewardship Award.
- Many municipalities in the watershed are taking action on climate change. For example, Zorra Township has climate change adaptation requirements recognized through Oxford County's Future Oxford objectives including a target of 100% renewable energy by 2050.

UTRCA staff recently recorded Rainbow Darters in Gregory Creek. The Rainbow Darter is one of the most colourful native fish in Ontario. The bright colours are thought to be beneficial for species recognition during spawning.

Good riparian cover and natural stream habitat help to improve water quality in the lower reaches of Gregory Creek.

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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