



Surface Water Quality
C - Steady

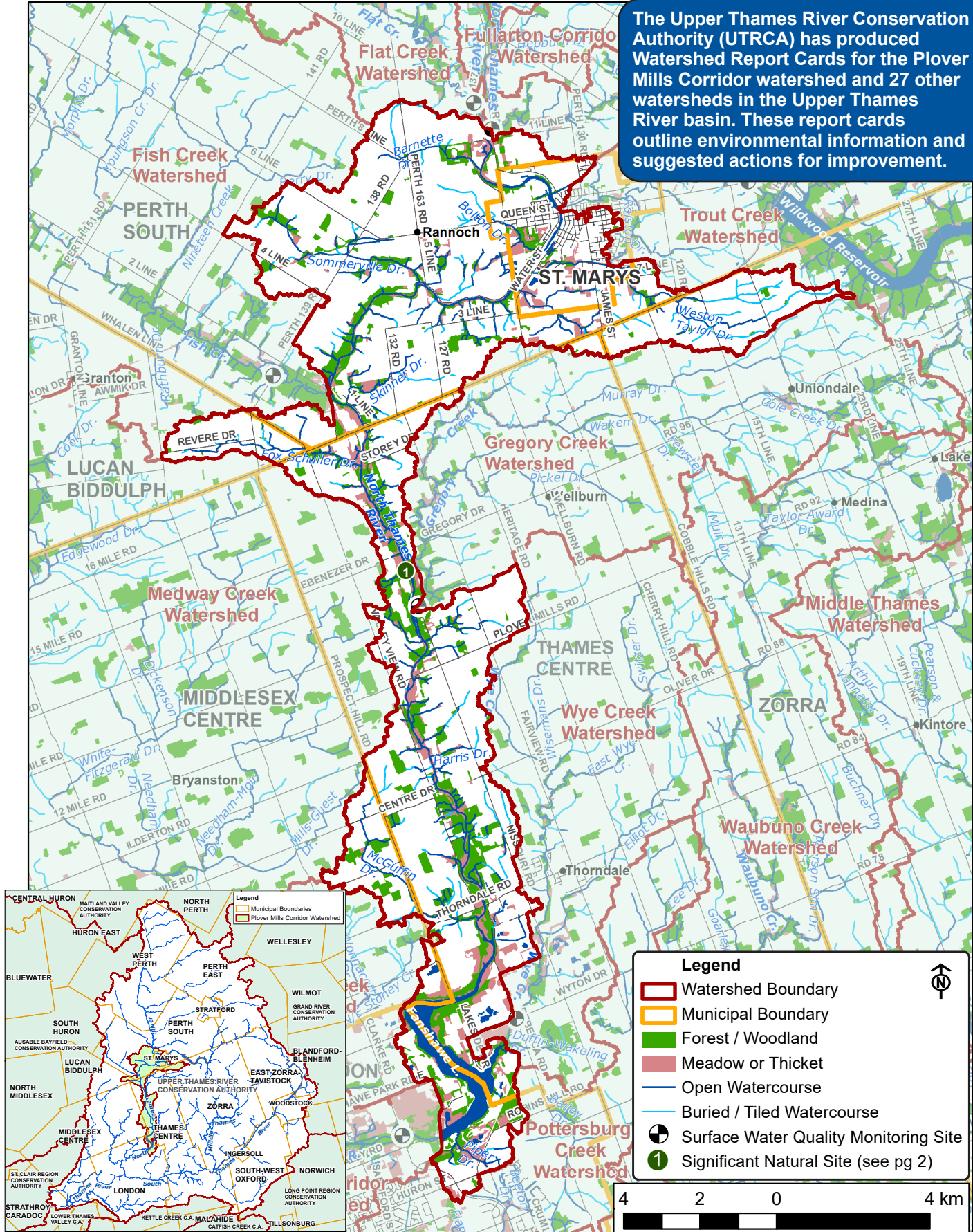


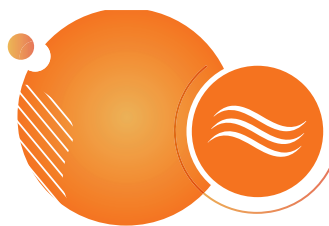
Forest Conditions
D - Slight Improvement

2022 Watershed Report Card

Plover Mills

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

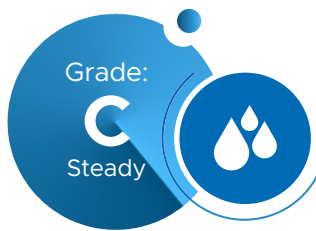




Watershed Features

Feature	Description					
Municipalities	Perth South (37%, 45 km ²), Thames Centre (36%, 42 km ²), St. Marys (8%, 10 km ²), Zorra (7%, 9 km ²), London (5%, 5 km ²), Middlesex Centre (4%, 4 km ²), Lucan-Biddulph (3%, 3 km ²). Total Area: 12,187 ha (122 km ²), 4% of the Upper Thames River watershed. 1,420 km ² lies upstream.					
Significant Natural Sites	Life Science Area of Natural and Scientific Interest (ANSI): (1) St. Ives Floodplain. (See numbered sites on map). Earth Science ANSI: Rannock Road Cut, St. Marys Cement Company South Quarry.					
Land Cover	63% agriculture, 18% natural vegetation, 3% open space, 8% built-up/urban, 4% water, 3% aggregates. There is 0.8% less agriculture, 0.5% more natural vegetation, and 0.3% more built-up than five years ago. There is 5% impervious cover (e.g., hard surfaces such as roofs and roads).					
Population	6,746 in 2021; a 14% increase since 2016 but some of this increase is due to watershed boundary corrections.					
Soil Type	52% clay loam, 16% silty loam, 13% bottomland, 9% not mapped (urban), 5% coarse sand, 4% silty clay loam, 1% loam					
Physiography	61% undrumlinized till plain, 33% spillway, 4% water, 2% sand plain, 1% till moraine					
Soil Erosion/Delivery	11% 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	47% of the watershed has agricultural field tile (15% random + 32% systematic), 8% urban drainage and 45% no tiling. An additional 1% of the watershed is tiled/drainage compared to five years ago.					
Watercourse Characteristics	Total length:	224 km of watercourses 43% natural, 31% channelized, 26% buried/closed 21% cool/coldwater, 79% warmwater/unconfirmed 0.23% slope (flat). Range is 0.09-1.26% in the Upper Thames River watershed				
Dams and Barriers	18 barriers to fish passage have been recorded including Fanshawe Dam and St. Marys Weir. Other barriers include perched culverts, beaver dams, stormwater ponds, etc.					
Spills	2001-2005	2006-2010	2011-2015	2016-2020	Recent reported spills involved fuels, industrial chemicals and food, fuels, and sewage.	
	26	34	11	9		
Sewage Treatment	St. Marys Wastewater Treatment Plant (WWTP) and Thorndale WWTP discharge treated effluent to the North Thames River within this corridor. Rural properties are serviced by private septic systems.					
% Vegetation Cover and Types	Vegetation cover: Composition:	2,154 ha or 17.7% of the Plover Mills Corridor watershed 48% deciduous forest, 10% mixed forest, 7% plantation/coniferous forest, 30% meadow, 5% thicket				
Wetland Cover	0.8% (103 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 0.4 ha of wetland cover were 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) 75
	Small (< 10 ha)	149	2	340	24	
	Medium (10-30 ha)	32	16	518	37	
	Large (> 30 ha)	11	49	539	39	
Fish and Mussels	Fish Species: 47 species. Gamefish: Smallmouth and Largemouth Bass, and Northern Pike. Mussel Species: 18 species.					
Species-at-Risk	Birds: 11 species including Bald Eagle and Wood Thrush. Fish: 4 species including Black Redhorse and Silver Shiner. Mammals: American Badger. Mussels: 4 species including Kidneyshell and Rayed Bean. Plants: 4 species including Blue Ash and Wood Poppy. Reptiles: 6 species including Midland Painted Turtle and Spiny Softshell.					

For more information on watershed features and how they compare to the other 27 subwatersheds, see the tables in the full report: 2022 Upper Thames River Watershed Report Cards at www.thamesriver.on.ca.



Surface Water Quality

Surface water quality has remained steady since the last report card and scores an overall grade of C. The UTRCA has a water quality target of a B grade for the Plover Mills Corridor by 2037.

At the monitoring station below Fanshawe Reservoir, phosphorus levels score a D and have been steady since 2017. Phosphorus levels are lower at the monitoring station upstream of Fanshawe reservoir at the Thorndale Bridge, compared to downstream.

E. coli bacteria levels are low compared to the other 27 subwatersheds, and score a B grade. *E. coli* levels are similarly low at the monitoring station upstream of Fanshawe reservoir at the Thorndale bridge.

Nitrate levels (from sources such as fertilizer and waste) remain above the provincial aquatic life guideline. Chloride levels (mainly from road salt) have remained below the aquatic life guideline over the long term.

There are some water quality issues—specifically within the Fanshawe Reservoir—caused by years of nutrient (phosphorus and nitrate) and sediment deposition on the lake bottom. As a result, algal blooms continue to occur.

After an improvement in 2017, benthic scores have returned to earlier values from when reporting began at this location. Benthic scores in this location are better than the Upper Thames River watershed average. A relatively natural channel flowing through a well vegetated stream corridor contributes to water quality and aquatic ecosystem health.

Indicators	Plover Mills Corridor					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996- 2000	2001- 2005	2006- 2010	2011- 2015	2016- 2020			
Phosphorus (mg/l) *	0.092 D	0.077 D	0.087 D	0.114 D	0.115 D Steady	0.110 D	0.030 B Aquatic Life	Phosphorus is found in products such as fertilizer, detergents, and waste, and contributes to excess algae and low oxygen in streams and lakes.
Bacteria (CFU <i>E. coli</i> / 100 ml) **	58 B	99 B	35 B	80 B	75 B 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)	5.48 C	5.66 C	5.60 C	4.99 B	5.37 C 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 the Plover Mills Corridor, Northern Pike are ambush predators. Holding still for long periods, they wait for prey and then exhibit remarkable acceleration as they strike. Northern Pike are able to feed for long periods of time because they can digest their food very quickly.



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 Plover Mills Corridor 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.

The percent forest cover (11.5%) has increased slightly from 11.2% in 2017 primarily due to improved mapping, but also natural succession (see table). The Environment Canada (EC) guideline for sustaining species and water quality in southern Ontario is a minimum of 30% forest cover. Other habitat types such as meadows and thickets add an additional 6.2% cover for a total of 17.7% natural vegetation cover in the Plover Mills watershed.

The percent forest interior (0.5%) has increased slightly from 0.4% but is still extremely low. This indicates that most woodlots are too small or 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 (37.6%) has increased from 33.4% primarily due to improved mapping methods. Levels are still below the EC guideline of 50%. Additional riparian areas are in meadow and thicket (22%) for a total of 59.6% riparian zone vegetated.

Indicators	Plover Mills 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	11.5 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	0.5 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	37.6 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	17
2006-2010	2
2010-2015	16

Approximately 16 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 19 ha of forest were cleared in the previous 10 years.

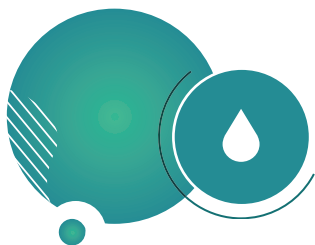
Forest Area Gained

Years	ha
2010-2015	60

New data shows that approximately 60 ha of forest were gained between 2010 and 2015 as a result of 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 three municipal wells in St. Marys draw groundwater from a deep bedrock aquifer and supply approximately 7,260 people. These are designated as GUDI (groundwater under direct influence of surface water) wells as the bedrock in this area is fractured and close to the surface. Municipal water is tested and treated.

Private Wells

Approximately 500 private wells are on record in the Plover Mills Corridor watershed, drawing from both bedrock and overburden 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 three Provincial Groundwater Monitoring Network wells in the Plover Mills Corridor watershed. They have 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

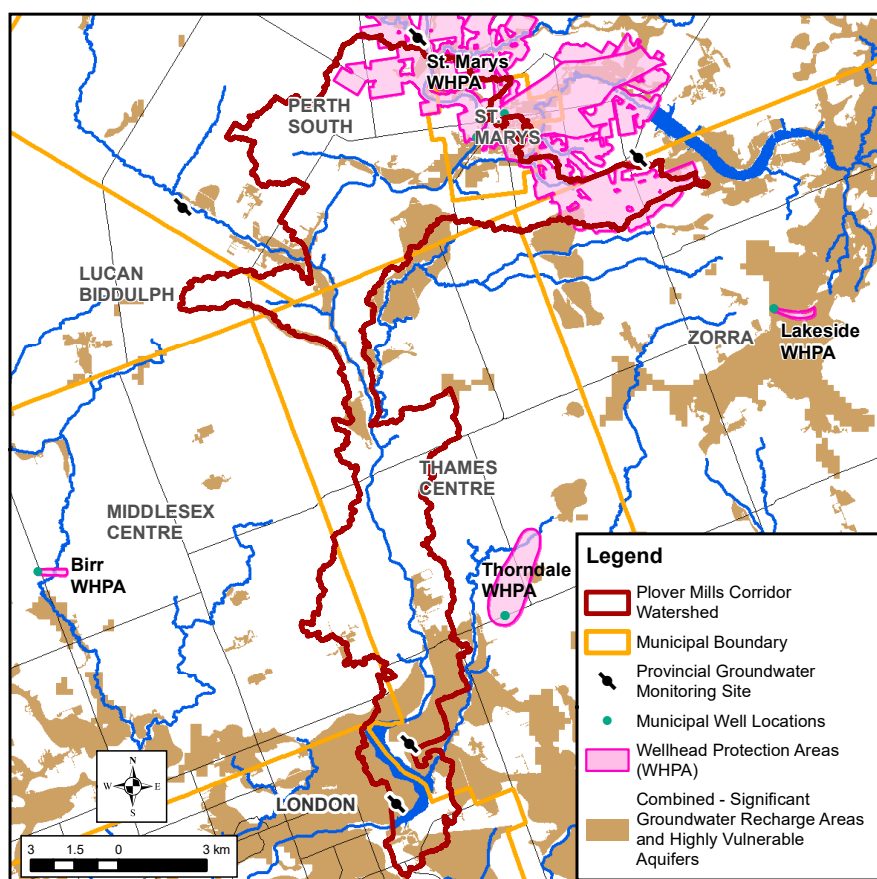
the recharge period is shifting later to November to May, with a trend of warmer and drier weather from October to November and cooler temperatures in May. The rate of decline in groundwater levels is directly related to maximum air temperatures. Summer rainfall does not typically affect groundwater 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 for information on groundwater resources, Source Protection Plan policies, and a Water Supply System Summary for St. Marys.



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)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2011)
- 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.
- Discourage ATV travel through watercourses as this activity can damage aquatic habitat and sensitive species such as freshwater mussels.
- Consider dam or barrier removal to improve stream health and fish passage, especially when a barrier no longer serves its intended purpose.
- 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 St. Marys, 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.



The UTRCA's Private Land Reforestation Program helps landowners create habitat, retire fragile agricultural land, plant windbreaks, and more.

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 and extend existing riverside woodlands and meadows with additional plantings to create a continuous wildlife corridor along the Plover Mills Corridor 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).
- Increase natural vegetation cover in urban areas by naturalizing manicured urban parks and open spaces, river valleys, residential and industrial areas, and school yards.
- 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 Plover Mills Corridor watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the Plover Mills Corridor 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 Plover Mills 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:

- In 2021, Perth South held its first Tree Power through 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 tree species. The goal of the program is to increase tree cover in the area.
- In 2021, a saturated buffer was installed at the Cade Tract to improve water quality and reduce flooding. The saturated buffer redirects inflowing tile runoff to a broad vegetated buffer area where the water is absorbed into the soil instead of being directly discharged to the creek.
- Two hay fields (5 ha total) at the Cade Tract were retired from agriculture and seeded with a native tallgrass prairie mix to increase wildlife habitat. The project was funded by Nature London, a private funder, and the UTRCA. In 2019, four local elementary school classes planted 300 native wildlife shrubs and trees on another field.
- In 2021, the UTRCA established a 58-acre demonstration farm near Thorndale. The UTRCA and partners have initiated projects that demonstrate various best management practices (BMPs) that improve soil health and local water quality. BMPs include broad- and narrow-based berms, blind inlets, stand pipe inlets, a rock chute, and windbreaks. The main feature is a controlled drainage system with 10 agricultural drain structures that control the amount of water held back in the system. Pollinator plants were added and trees were planted on a highly erodible slope.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. Perth County Municipalities share a Climate Change Coordinator, and there is a commitment to taking action on climate change by the Federation of Canadian Municipalities under the Partners for Climate Protection Program. In

addition, Zorra Township has climate change adaptation requirements recognized through Oxford County's Future Oxford objectives including a target of 100% renewable energy by 2050.

- Over 27,400 trees were planted at 38 sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- Through UTRCA's Communities for Nature program (2016-2020), 180 students helped plant 830 trees and many wildflower and grass seeds at sites including Memorial Forest, St. Marys Cement, Fanshawe LID, and Fanshawe Pioneer Village.
- Watershed landowners completed 12 Clean Water Program (CWP) projects involving fragile land retirement, wellhead protection, and decommissioning unused wells. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (see www.cleanwaterprogram.ca). Since 2001, 126 projects have been completed in this watershed.
- In 2020, the Town of St. Marys and the UTRCA implemented a plan to control Dog-strangling Vine and Common Periwinkle in the Sparling Bush woodlot. Patches of the invasive plants were smothered under plastic tarps and woodchips (photo below). Controlling non-native invasive species was one of four strategic priorities identified in the Sparling Bush Plan (2020-2022).



Ontario-Wide Report Cards

Conservation Authorities produce report cards for their watersheds every five years to track changes, using a standardized grading system (www.conservationontario.ca). Grades vary across the province, reflecting the range of physical characteristics and human activities. The complete set of UTRCA report cards and supporting information are available in a report titled 2022 Upper Thames River Watershed Report Cards (thamesriver.on.ca).

For more information, contact:

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Thames
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