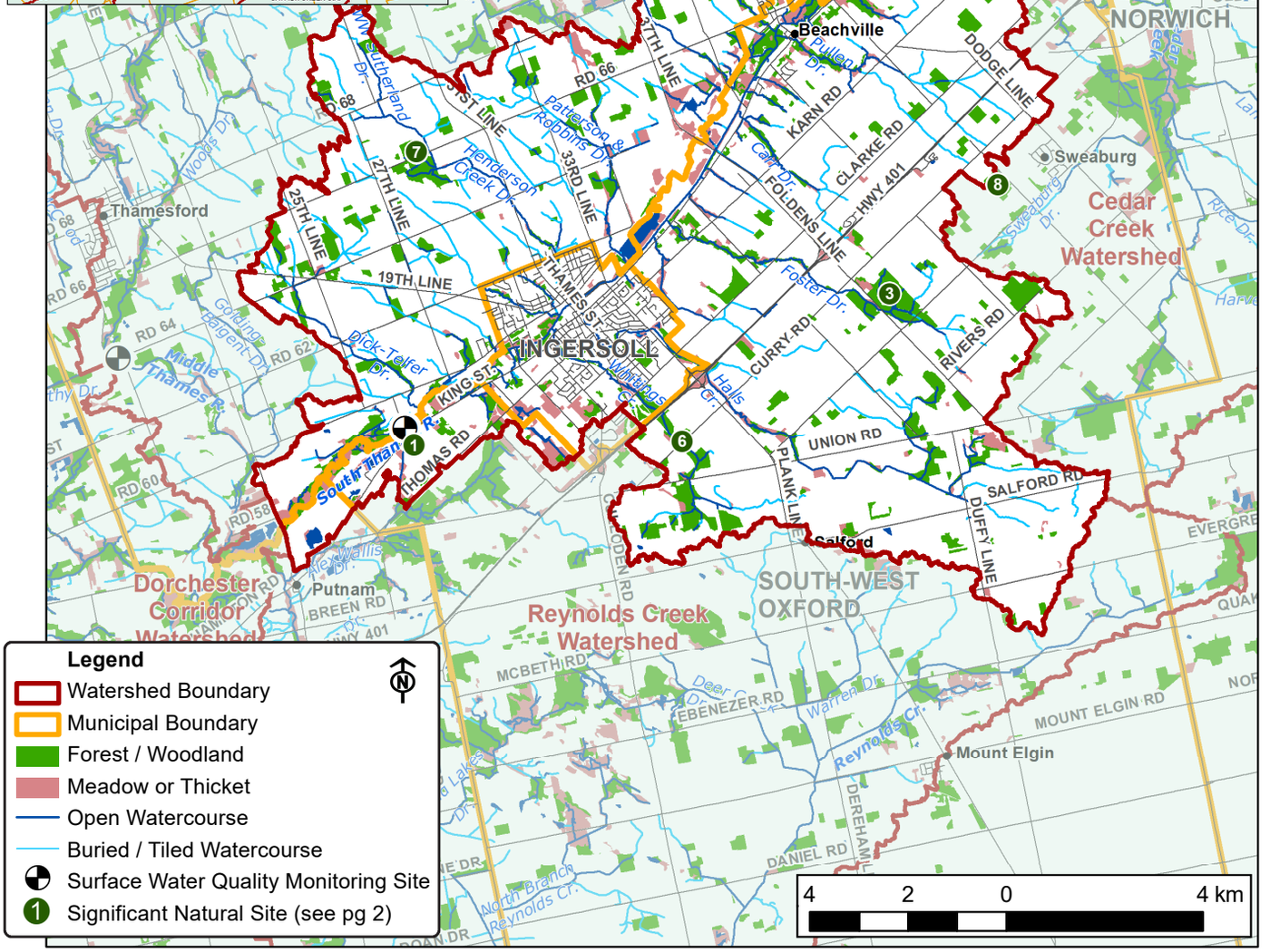
Surface Water Quality
D - Steady

Forest Conditions
D - Steady

2022 Watershed Report Card

Ingersoll

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Ingersoll Corridor 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	South-West Oxford (44%, 94 km^2), Zorra (35%, 76 km^2), East Zorra-Tavistock (12%, 25 km^2), Ingersoll (6%, 12 km^2), Woodstock (3%, 7 km^2), Thames Centre (1%, 1 km^2). Total Area: 21,524 ha (215 km^2), 6% of the Upper Thames River watershed. 341 km^2 lies upstream.
Significant Natural Sites	Significant Wetlands: (1) Five Points Woods, (2) Golspie Swamp, (3) Foldens Swamp, (4) Burgess Park Wetland, (5) Thames River Wetland. Other Wetlands: (6) Heslop Swamp, (7) Rayside Swamp. Life Science Areas of Natural and Scientific Interest (ANSI): (8) Trillium Woods, (9) Karn's Maple Bush. (See numbered sites on map). Earth Science ANSI: Stelco Quarry.
Land Cover	69% agriculture, 16% natural vegetation, 2% open space, 11% urban/built-up, 3% aggregates, 1% water. Approximately 0.5% more agriculture and 1% less natural vegetation than five years ago. 6% impervious cover (e.g., hard surfaces such as roofs and roads).
Population	25,113 in 2021; a 13% increase since 2016
Soil Type	39% sandy loam, 33% silty loam, 9% loam, 7% not mapped/urban, 6% clay loam, 3% bottomland, 3% organic
Physiography	62% drumlinized till plain, 22% spillway, 9% drumlins, 6% till moraine, 1% clay plain
Soil Erosion/ Delivery	16% 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	33% of the watershed has agricultural field tile (8% random + 24% systematic), 11% urban drainage, 57% no tiling. An additional 6% of the watershed is tiled compared to five years ago.
Watercourse Characteristics	Total length: 374 km of watercourses Watercourse type: 31% natural, 30% channelized, 39% buried/closed Temperature: 19% cool/coldwater, 81% warmwater/unconfirmed Main channel slope: 0.28% slope (low/flat); range is 0.09-1.26% in Upper Thames River watersheds
Dams and Barriers	48 barriers to fish passage have been recorded, including Centreville Conservation Area dam. Barriers include dams, weirs, perched culverts, debris blockages, beaver dams, and stormwater ponds.
Spills	2001-2005: 22; 2006-2010: 51; 2011-2015: 44; 2016-2020: 32 Recent reported spills involved fuels, industrial chemicals, sewage, and others.
Sewage Treatment	The Woodstock and Ingersoll Wastewater Treatment Plants discharge treated effluent to the South Thames River within this watershed. Rural properties are serviced by private septic systems.
% Vegetation Cover and Types	Vegetation cover: 3,198 ha or 14.9% of the Ingersoll Corridor watershed Composition: 59% deciduous forest, 11% mixed forest, 3% plantation/coniferous forest, 22% meadow, 4% thicket
Wetland Cover	5.1% (1,087 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 7.3 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)
Small (< 10 ha)	270	3	786	34	266
Medium (10-30 ha)	46	16	730	31	
Large (> 30 ha)	11	75	829	35	

Fish and Mussels	Fish Species - 38 species. Gamefish - Smallmouth and Largemouth Bass, Northern Pike, and Brook and Brown Trout. Mussel Species - 9 species.
Species-at-Risk	Birds - 11 species including Bald Eagle and Chimney Swift. Insects - Monarch and Yellow-banded Bumble Bee. Mammals - American Badger and Gray Fox. Mussels - Rainbow and Round Pigtoe. Plants - 3 species including Broad Beech Fern and Butternut. Reptiles - Snapping Turtle, Spiny Softshell Turtle, and Midland Painted 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.

2022 Watershed Report Card

Surface Water Quality

Surface water quality in Ingersoll Corridor has remained steady since the last report card, and scores an overall grade of D. Samples were taken at the Provincial Water Quality Monitoring Network station downstream of the Town of Ingersoll (see map). Water quality in the Ingersoll Corridor is affected by local activities as well as inputs from the upstream section of the South Thames River from Tavistock to Woodstock. The UTRCA has a water quality target of a C grade for the Ingersoll Corridor by 2037.

Phosphorus levels have shown a large improvement from the 1970s to now. Since 2015, there has been some increase in phosphorus, and levels remain well above the provincial guideline. Levels improve from the station at Highway 2 in Woodstock to downstream of Ingersoll.

E. coli bacteria levels have improved since 1990, as well as more recently (since 2015). *E.coli* levels are similar downstream of Ingersoll to those at the upstream station at Highway 2 in Woodstock. Nitrate levels (from sources such as fertilizer and waste) have increased over the long term and are above the aquatic life guideline. Since 1990, chloride levels (mainly from road salt) have been increasing but are still mainly below the aquatic life guideline.

Stream health, as indicated by benthic invertebrate sampling, showed a very slight decline since the last report card. The Ingersoll Corridor watershed has several fairly high quality tributaries, but much of the main channel has been straightened which interferes with natural stream processes.

Indicators	Ingersoll Corridor					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	0.150 D	0.164 D	0.132 D	0.117 D	**0.176 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 *E. coli*/ 100 ml) **	533 D	354 D	343 D	377 D	**252 C Improved**	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)	6.42 D	6.92 F	6.72 F	6.41 D	**6.48 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 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 Ingersoll Corridor watershed, the Largemouth Bass is a sight feeder, with adults mainly eating fish, frogs, and crustaceans. During spawning, the male prepares the nest, fans the fertilized eggs with his fins, and guards the eggs as well as the young once they have hatched.

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 Ingersoll Corridor 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 (10.9%) decreased slightly from 11% in 2017 primarily due to watershed boundary adjustments. The Environment Canada (EC) guideline for sustaining species and quarter quality in southern Ontario is 30% forest cover. Meadows and thickets add another 4% for a total of 14.9% natural vegetation cover.

The percent forest interior (1.3%) is low, indicating that most woodlots are too small and narrow to support area sensitive species such as Scarlet Tanager and Ovenbird. The EC guideline is 10% forest interior.

The percent riparian zone forested (39.8%) has increased slightly from 38.9% in the last report card primarily due to mapping improvements, and is approaching the EC guideline of 50%. Additional riparian areas are in permanent meadows and thicket (19.0%) for a total of 58.8% riparian zone vegetated.

Indicators	Ingersoll Corridor 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	**10.9 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	**1.3 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	**39.8 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

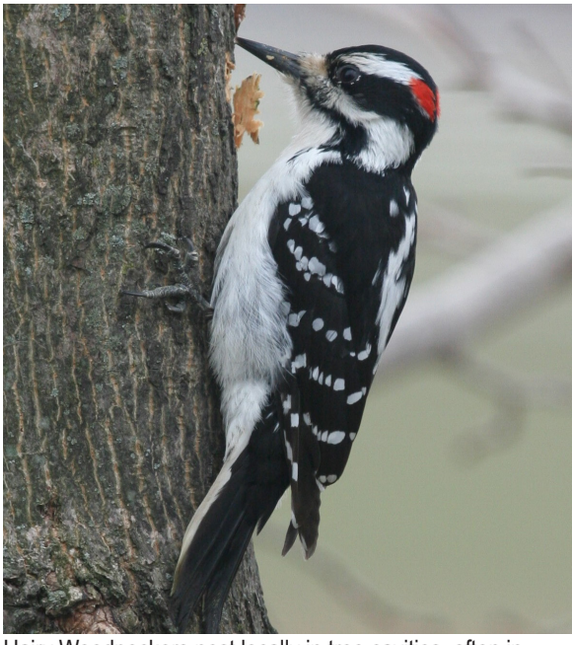
Years	ha
2000-2006	31
2006-2010	22
2010-2015	24

Approximately 24 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 53 ha of forest were cleared in the previous 10 years.

Forest Area Gained

Years	ha
2010-2015	40

New data shows that approximately 40 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.



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

2022 Watershed Report Card

Groundwater

Municipal Water Supply

There are seven municipal wells in the Town of Ingersoll supplying over 13,600 people, and one municipal well in Beachville supplying 210 people. The wells draw groundwater from a deep bedrock aquifer. A portion of this watershed is supplied by the 11 municipal wells in Woodstock (both bedrock and shallow overburden aquifers). Municipal well water is tested and treated.

Private Wells

Approximately 1,570 private wells are on record in the Ingersoll Corridor watershed, drawing from overburden and 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

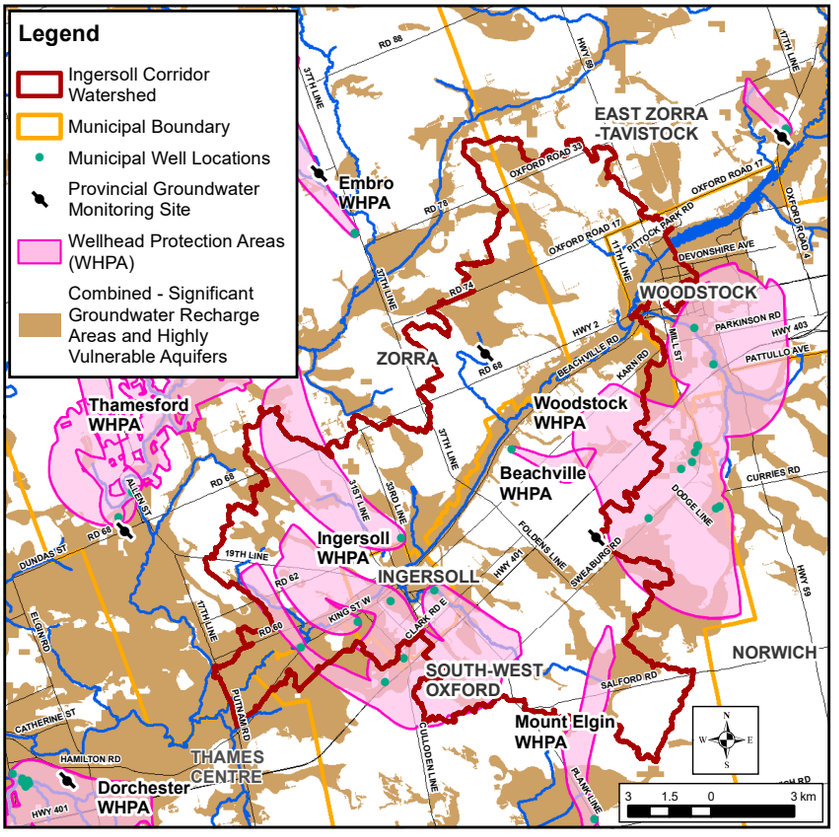
Since 2003, the UTRCA has monitored two Provincial Groundwater Monitoring Network wells in the Ingersoll watershed. They have shown that groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). 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 Summaries for Beachville, Ingersoll and Woodstock.



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

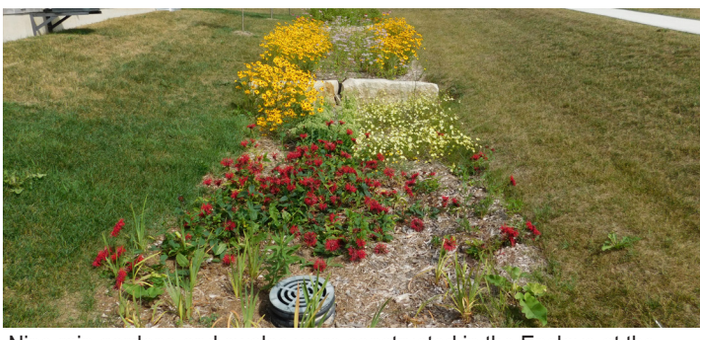
Individuals, groups, businesses, municipalities, and agencies all have a role in improving the health of the watershed through these suggested actions. For more information on agencies that can help, contact the UTRCA (see page 8).

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 Systems Study (Oxford County, 2016 draft)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- 2007 Stormwater Management Strategy Study, Water Quality and Aquatic Resources Monitoring Report for the Town of Ingersoll (UTRCA, 2008)
- Woodstock Natural Heritage Inventory (UTRCA, 2007)
- Ingersoll Stormwater Strategy (Dillon Consulting, 2007)
- Woodlands Study for Ingersoll (UTRCA, 2004)

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.
- Ingersoll Corridor watershed has many dams/barriers. Evaluate their role, function, and aquatic habitat impacts, and consider removal or modification to improve stream health and fish passage.
- 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.
  - Target work to reduce soil loss in highly erodible areas (16% of this watershed is highly erodible land).
  - 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 Woodstock and Ingersoll, 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 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 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.



Nine rain gardens and swales were constructed in the Enclave at the Victoria Hills development in Ingersoll to filter and infiltrate runoff.

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.
- Increase natural vegetation cover in urban areas by targeting the naturalization of manicured parks and open spaces, river valleys, residential and industrial areas, school yards, and through urban planning and design.
- 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.
- Target land retirement and naturalization projects on highly erodible soils and retired aggregate pits.
- 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 Ingersoll Corridor is in the Thames River watershed, which is part of the Lake Erie watershed. Water from the Ingersoll 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 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 Ingersoll 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:

- Students from AJ Baker School planted hundreds of milkweed plants and wildflower seeds at three locations in Zorra Township in 2017.
- In 2018, UTRCA staff assisted watershed landowners in establishing eight new wetlands. In total, 4.5 hectares of marsh and swamp habitat were created and more than 30 ha of total land base was naturalized. The County of Oxford, Canada-Ontario Agreement, and Ontario Power Generation were the principal funders in these projects.
- Oxford County Trails Council, the UTRCA, and other partners have been improving the Oxford Thames River Trail in Beachville. Wetlands have been created and trees and shrubs have been planted. Work on extending the trail towards Woodstock continues, along with the associated habitat restoration work. The County of Oxford has planted approximately 6,000 trees at the nearby Thames River Wetlands.
- Carmeuse celebrated the opening of the new Limestone Valley Trail at the East Plant near Beachville in November 2020. Built on old reclaimed mine property on Domtar Line just north of the Thames River, this trail provides public access to nature. Bird and bat boxes were installed for species in decline and a pollinator-friendly garden sanctuary was created. Other partners of this project were the UTRCA, Beachville District Museum, and Oxford County Trails Council.
- The Ingersoll Wastewater Treatment Plant expansion project was completed in 2018 following the decommissioning of the old 1947 plant. The project consisted of alterations and extensions to existing municipal sewage works to expand capacity by 26%. Upgrades to improve treatment capacity and efficiency have continued to service the ongoing growth in the community. Recent upgrades ensure reliable plant performance, optimization of treatment, and the promotion of green energy production.
- The Thames Talbot Land Trust added 23 ha to its Five Points Forest Nature Reserve. The newest plot, named Ross's Woods after local raptor rehabilitator Ross Snider, is a unique mixed deciduous/coniferous wetland containing a cool water stream.
- Approximately 13,580 trees were planted at 21 rural locations under the UTRCA's Private Land Reforestation Program.
- Watershed landowners completed 12 Clean Water Program projects including fragile land retirement/ reforestation and decommissioning unused wells. Since 2001, 129 projects have been completed in this watershed.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. For example, South-West Oxford, Zorra Township, East-Zorra-Tavistock, Ingersoll, and Woodstock have climate change adaptation requirements recognized through Oxford County's Future Oxford objectives including a target of 100% renewable energy by 2050.

At Burgess Park, the UTRCA and City of Woodstock installed wetlands, undertook erosion control work, and seeded a two acre tallgrass prairie. With the assistance of students and community groups, trees and shrubs have been planted to increase biodiversity in the area.

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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UPPER THAMES RIVER CONSERVATION AUTHORITY

Thames Canadian Heritage River