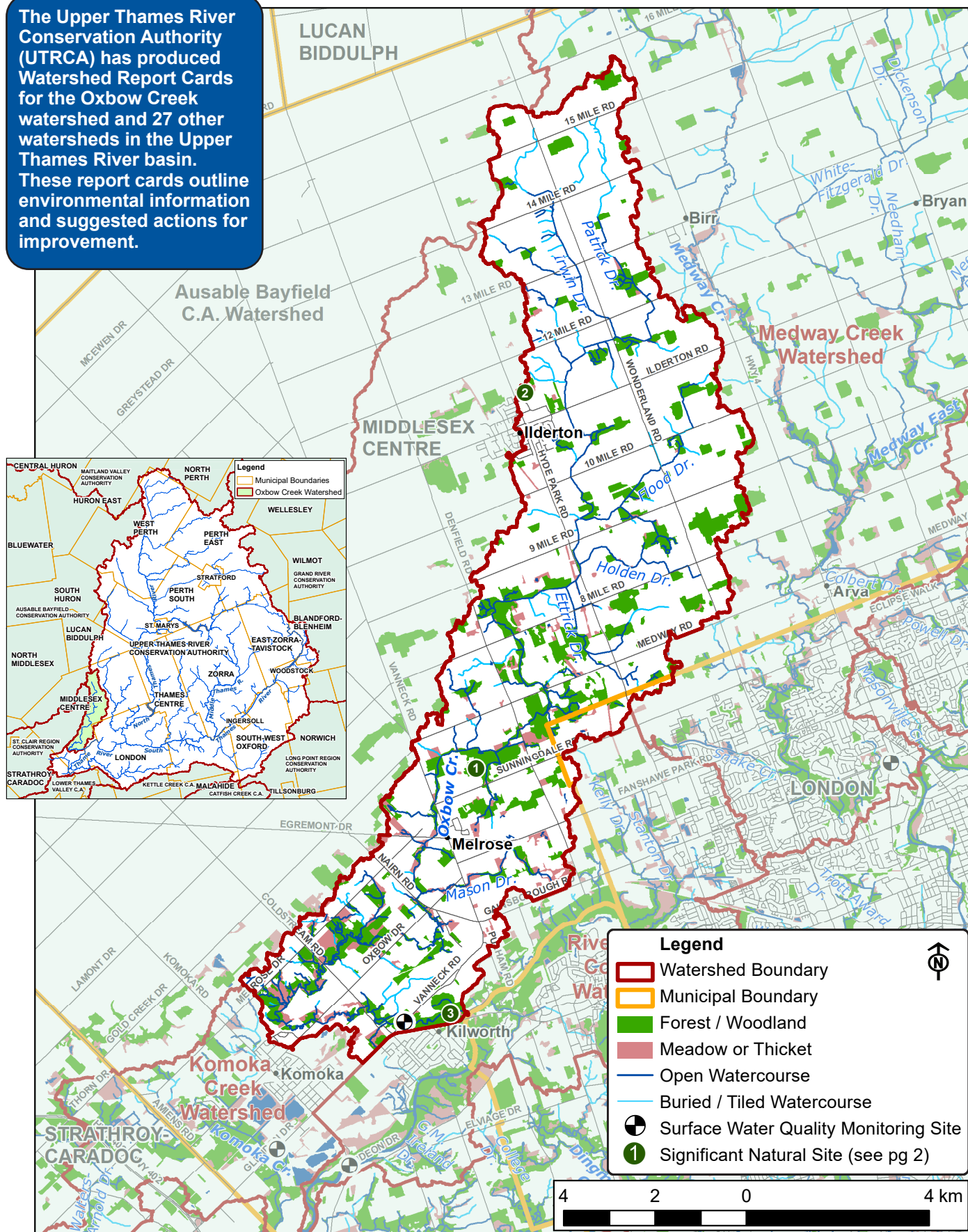


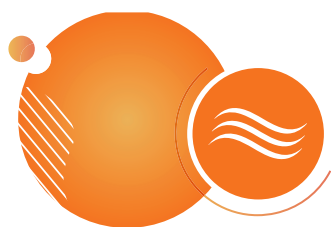


2022 Watershed Report Card

Oxbow Creek

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Oxbow 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	Middlesex Centre (98%, 86 km ²), City of London (2%, 2 km ²) Total Area 8,748 ha (88 km ²), 3% of Upper Thames River watershed					
Significant Natural Sites	Significant Wetland: (1) Oxbow Creek Wetland. Other Wetland: (2) Hyde Park Wetland. Life Science Area of Natural and Scientific Interest (ANSI): (3) Komoka Park Reserve/Springers Creek Woodlot. (See numbered sites on map). Earth Science ANSI: Elginfield Area Moraines.					
Land Cover	73% agriculture, 18% natural vegetation, 2% open space, 6% built-up/urban, 0% aggregates, < 1% water. There is little change from five years ago. 3% impervious cover (e.g., hard surfaces such as roofs and roads).					
Population	3,370 in 2021; a slight decline since 2016 but this may be partly due to watershed boundary corrections.					
Soil Type	49% silty loam, 22% silt clay loam, 15% clay loam, 9% bottomland, 3% coarse sand, 1% organic, 1% not mapped (urban)					
Physiography	40% till moraine, 27% spillway, 27% undrumlinized till plain, 6% sand plain					
Soil Erosion/Delivery	10% 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	58% of the watershed has agricultural field tile (35% random + 23% systematic), 6% urban drainage, 36% no artificial drainage. An additional 5% of the watershed is tiled/drained compared to five years ago.					
Watercourse Characteristics	Total length: Watercourse type: Temperature: Main channel slope:	156 km of watercourses 45% natural, 30% channelized, 25% buried/closed 17% cool/coldwater, 83% warmwater/unconfirmed 0.36% slope (moderate); range is 0.09-1.26% in the Upper Thames River watershed				
Dams and Barriers	17 barriers to fish passage have been recorded in this watershed. Most barriers are small features such as perched culverts, debris blockages, and beaver dams.					
Spills	2001-2005 6	2006-2010 8	2011-2015 4	2016-2020 11	Recent reported spills involved fuels, industrial chemicals, and sewage.	
Sewage Treatment	The Ilderton Wastewater Treatment Plant services the Town of Ilderton and discharges treated effluent into Oxbow Creek. Rural residences in the watershed are serviced by private septic systems.					
% Vegetation Cover and Types	Vegetation cover: Composition:	1,550 ha or 17.7% of the Oxbow Creek watershed 67% deciduous forest, 8% mixed forest, 5% plantation/coniferous forest, 15% meadow, 5% thicket				
Wetland Cover	6.5% (572 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. 1.6 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)	111	3	334	27	169
	Medium (10-30 ha)	25	17	428	35	
	Large (> 30 ha)	6	79	476	38	
Fish and Mussels	Fish Species: 46 species. Gamefish: Brown and Rainbow Trout, and Smallmouth and Largemouth Bass. Mussel Species: 9 species.					
Species-at-Risk	Birds: 12 species including Barn Swallow and Wood Thrush. Fish: Northern Brook Lamprey, Northern Sunfish, and Silver Shiner. Mammals: American Badger. Mussels: Rainbow. Reptiles: Midland Painted Turtle and Snapping Turtle. Plants: 3 species including Butternut and Eastern Flowering Dogwood.					

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



Surface Water Quality

Surface water quality has remained steady in Oxbow Creek since the last report card, and scores an overall grade of D. In 2002, a water quality monitoring station was added to Oxbow Creek at Vanneck Road (see map). The UTRCA has a water quality target of a C grade for Oxbow Creek by 2037.

Phosphorus levels have remained steady and are at three times the guideline for aquatic life. However, they are lower than the Upper Thames River average. *E. coli* bacteria levels have been steady since 2015 and are at the Upper Thames River average.

Nitrate levels (from sources including fertilizer and waste) remain above the provincial aquatic life guideline. Chloride levels (mainly from road salt) continue to be well below the aquatic guideline. Metals such as lead, copper, and zinc are well below provincial guidelines.

Water quality, based on benthic scores, has declined somewhat since the last reporting period. Extensive fish and benthic monitoring revealed that water quality and aquatic habitat were poorer in the upper portion of the watershed, but improved downstream. This is due to the presence of a well buffered, natural stream channel.

Indicators	Oxbow Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.076 D	0.072 D	0.089 D	0.097 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) **	No data	343 D	177 C	165 C	214 C Steady	211 C	200 C Recreation	<i>E. coli</i> is a fecal coliform bacteria found in human and animal (livestock/wildlife/pets) waste. <i>E. coli</i> is a strong indicator of the potential to have other disease-causing organisms in the water.
Benthic Score (FBI)	5.82 D	5.92 D	5.96 D	5.99 D	6.19 D Steady	5.99 D	< 5.00 B Target Only	Benthic organisms (aquatic invertebrates that live in stream sediments) are good indicators of water quality and stream health. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance.

*75th percentile, MECP Provincial Water Quality Monitoring Network data. **Geometric mean, Health Unit data. Province-wide grading system used (see page 8). In 2019, the Provincial Recreational Guideline for *E. coli* changed from 100 Colony Forming Units *E. coli* / 100 ml to 200 CFU *E. coli* / 100 ml.

Found in Oxbow Creek, Brook Stickleback display complex spawning behaviour. Males establish territories and begin nest construction on a vertical piece of grass or a stick. They use materials such as algae, plant fibres, and small twigs bound together with a white secretion from the kidneys. The nests are round, up to 35 mm in diameter, and initially built with one opening. Once the female has laid eggs, the male chases her out of the nest. When she exits, she creates a second opening.



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 Oxbow 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.

The percent forest cover (14.2%) has increased from 13.5% in 2017 primarily due to improved mapping as well as natural succession. The Environment Canada (EC) guideline for sustaining species and water quality in southern Ontario is 30% forest cover. Other habitat types such as meadows and thickets add an additional 3.6% for a total of 17.7% natural vegetation cover in the Oxbow watershed.

The percent forest interior (1.2%) is low, indicating most woodlots are too small and/or narrow to support area sensitive birds such as Scarlet Tanager and Ovenbird. The EC guideline is 10% forest interior.

The percent riparian zone forested (43.2%) has increased from 39.6% in the last report card primarily due to mapping improvements. Levels are close to the EC guideline of 50%. Another 13.8% of the Riparian Zone is in natural meadow or thicket for a total of 56.9% riparian zone vegetated.

Indicators	Oxbow Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	14.2 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	1.2 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	43.2 B	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

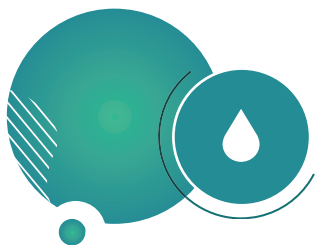
Years	ha	
2000-2006	17	Approximately 13 ha of forest were cleared and converted to other uses (e.g., urban, agriculture, aggregates) between the 2010 and 2015 air photography. An additional 36 ha of forest were cleared in the previous 10 years.
2006-2010	19	
2010-2015	13	

Forest Area Gained

Years	ha	
2010-2015	47	New data shows that approximately 47 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



Groundwater

Municipal Water Supply

Two municipal wells in Melrose draw groundwater from overburden aquifers rather than bedrock. The wells supply approximately 220 people. Most of Ilderton's water is supplied by pipeline through the Lake Huron Primary Water Supply System. Municipal water is tested and treated.

Private Wells

Approximately 600 private wells are on record in this watershed, the majority drawing groundwater from overburden aquifers. Properly constructed deep wells have a lower risk of contamination from the surface than shallow wells. The highest risk to a well is from contaminants and activities closest to the well. The safety, testing, and treatment of a private well are the responsibility of the well owner.

Groundwater Monitoring

The Provincial Groundwater Monitoring Network has shown groundwater levels to 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

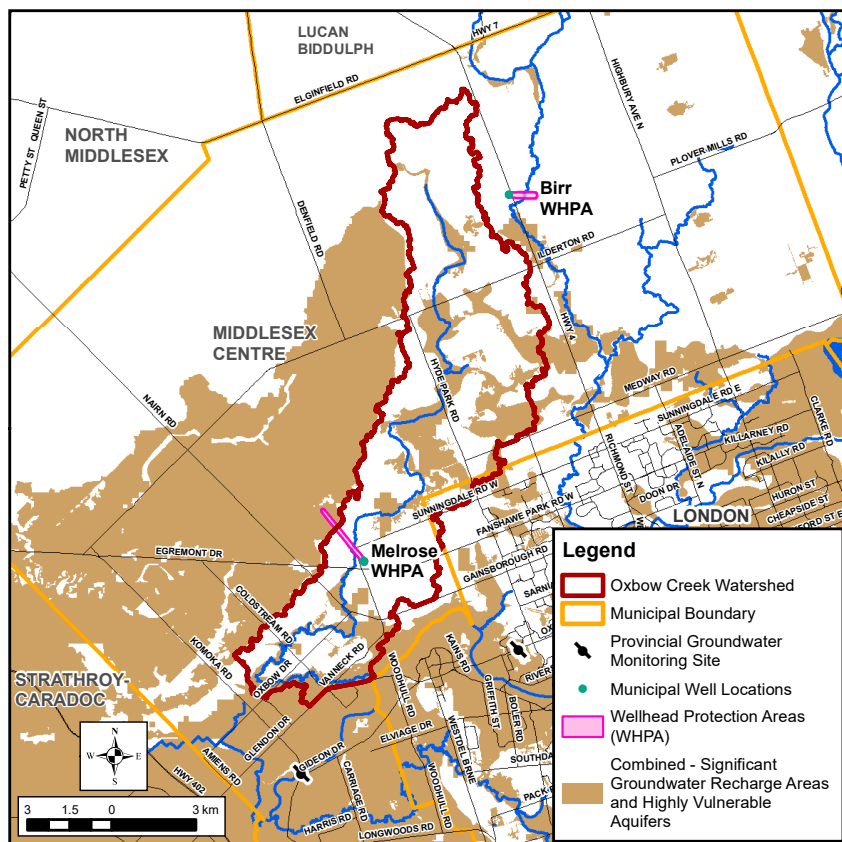
to maximum air temperatures. Summer rainfall does not typically affect groundwater levels as evaporation and plant uptake greatly exceeds rainfall, and most rainfall is utilized by plants during summer.

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 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 Melrose.



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)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)

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.
- 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 Ilderton and developing areas, 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 Oxbow 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).
- Target land retirement and naturalization projects on highly erodible soils.
- 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 Oxbow Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from Oxbow Creek enters the Thames River downstream of London and takes 4-10 days to flow through 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 Oxbow 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:

- The Ilderton Wastewater Treatment Plant has undergone several upgrades to improve efficiency and protect water quality. Work included the replacement of inlet sewers, installation of a new raw sewage pumping station, and construction of a flow equalization tank to contain peak flows. The screening and grit removal system was replaced with new combined units.
- Over 2,400 trees were planted at 24 sites through the UTRCA's Private Land Reforestation Program from 2016 to 2020.
- In 2016-2020, 435 students and 1,380 community members helped plant 2,650 trees and 1,800 wildflowers and grasses at 12 sites through the UTRCA's Communities for Nature program.
- Watershed landowners completed eight Clean Water Program (CWP) projects involving 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).
- Many municipalities in the Upper Thames River watershed are taking action on climate change. In 2019, London City Council declared a Climate Emergency. In response, the London Climate Emergency Action Plan or CEAP (2021/2022) was developed to reduce greenhouse gas emissions, improve resilience to climate change while listing over 200 actions for the London community to implement. In addition, the Middlesex Centre Strategic Plan 2021-2026 outlines a commitment to "incorporate considerations associated with climate change in all our programming and service delivery, and identify and undertake 'Green' initiatives with a calculated pay-back period where appropriate."
- The UTRCA led the installation of a saturated buffer at the Western University Research Farm. Water within a

tile drain outlet was directed to a control structure where that water is held back and diverted into the perforated distribution pipe. Once at the pipe, the water is slowly pushed through a grassed buffer strip, enabling nutrient removal by the plants within the buffer. This edge-of-field practice has been shown to effectively remove nitrates from tile water in the USA and is being monitored to see if it can work similarly in Ontario.

- In 2022, the Thames Talbot Land Trust (TTLT) added Boview Farm (below) to its list of nature reserves. The 35 ha farm and woodland on Oxbow Creek was a bequest from the estate of Paul and Mary Harding who stewarded the land for many decades. The TTLT will continue to enhance the ecological integrity of Boview Farm.



On Boview Farm, buffer strips located between the rural land and bodies of water help reduce water pollution, create habitat, and control erosion. Photo: TTLT



Oxbow Creek supports Northern Brook Lamprey, a species-at-risk. This lamprey lives in cold water streams, spending most of its life as larva buried in softer bottom substrate. Despite their name, this species is non-parasitic as the larva are filter feeders and the adults do not feed at all.



Ontario-Wide Report Cards

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

For more information, contact:

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Thames
Canadian Heritage River