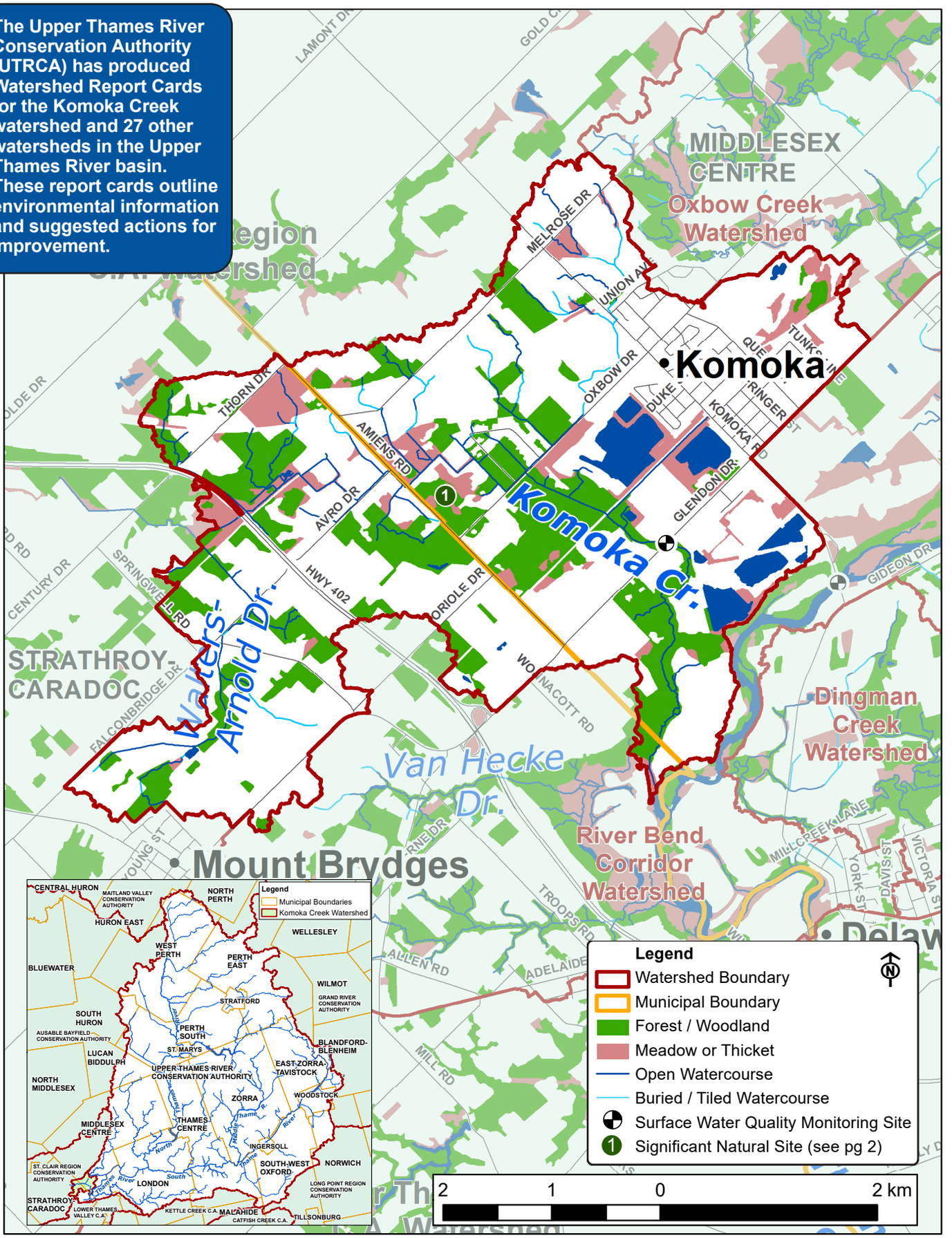
Surface Water Quality
C - Steady

Forest Conditions
C - Steady

2022 Watershed Report Card

Komoka Creek

The Upper Thames River Conservation Authority (UTRCA) has produced Watershed Report Cards for the Komoka 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	Middlesex Centre (61%, 14 km^2), Strathroy-Caradoc (39%, 9 km^2) Total Area: 2,263 ha (23 km^2), 1% of Upper Thames River watershed
Significant Natural Sites	Significant Wetlands: (1) Komoka/South Strathroy Creek Wetlands (see numbered site on map). Earth Sciences Areas of Natural and Scientific Interest: Komoka Lake Maumee
Land Cover	47% agriculture, 28% natural vegetation, 4% open space, 15% urban/built-up, 2% aggregates, 6% water. Approximately 2% less agriculture, 1% more natural vegetation, 1% more urban, and 1% less aggregates than five years ago. 5% impervious cover (e.g. hard surfaces such as roads and roofs).
Population	3,285 in 2021; an 82% increase since 2016 (some of the increase is due to boundary corrections)
Soil Type	63% loamy fine sand, 12% not mapped (urban), 8% silty loam, 6% coarse sand, 5% silt clay loam, 4% organic, 2% bottomland
Physiography	89% sand plain, 6% till moraine, 4% spillway, 1% water
Soil Erosion/ Delivery	4% 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	84% of the watershed has no tiling, 15% urban drainage, 1% agricultural field tile. An additional 10% of the watershed has tiling/drainage compared to five years ago.
Watercourse Characteristics	Total length: 43 km of watercourses Watercourse type: 35% natural, 50% channelized, 15% buried/closed Temperature: 16% cool/coldwater, 84% warmwater/unconfirmed Main channel slope: 1.23% slope (very steep) on Komoka Creek, 0.13% slope (very flat) on Walter's Arnold Drain; range is 0.09-1.26% in Upper Thames River watersheds
Dams and Barriers	Five barriers to fish passage have been recorded, mainly perched culverts, beaver dams, and stormwater ponds.
Spills	2001-2005: 0; 2006-2010: 1; 2011-2015: 2; 2016-2020: 4 Recent reported spills involved industrial chemicals and sewage.
Sewage Treatment	There are no sewage treatment plants discharging into Komoka Creek. Properties in Komoka are serviced by the Komoka Wastewater Treatment Plant which discharges treated effluent into the Thames River. Rural residences in the watershed are serviced by private septic systems.
% Vegetation Cover and Types	Vegetation cover: 610 ha or 27% of the Komoka Creek watershed Composition: 68% deciduous forest, 3% mixed forest, 3% plantation/coniferous forest, 22% meadow, 5% thicket
Wetland Cover	12.9% (292 ha) of the watershed is in wetland cover. Environment Canada (2013) recommends at least 6% wetland cover. Wetlands make up 48% of the natural vegetation cover of the Komoka Creek watershed. 2.8 ha of wetland cover were lost between 2010 and 2015.
Woodlot or Patch Size	See table below
Fish and Mussels	Fish Species: 24 including 3 historic species Gamefish: Largemouth Bass, Northern Pike, and Brown and Rainbow Trout Mussel Species: 0 documented by more sampling is needed
Species-at-Risk	Birds: 8 species including Barn Swallow and Eastern Meadowlark Insects: Monarch Plants: Crooked-stem Aster, Tuberous Indian-plantain, Willow-leaved Aster Reptiles: 4 species including Midland Painted Turtle and Snapping Turtle

Size Category	Number of Woodlots	Average Size (ha)	Total Woodland Area (ha)	% of Woodland Area	Largest Woodlot (ha)
Small (< 10 ha)	33	3	86	19	116
Medium (10-30 ha)	6	15	89	20	
Large (> 30 ha)	4	68	271	61	

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 Komoka Creek has remained steady since the last report card, and scores an overall grade of C. A water quality monitoring station was added to Komoka Creek at Glendon Drive (see map) in 2002. The UTRCA has a water quality target of a B grade for Komoka Creek by 2037.

Phosphorus levels have remained steady (close to the provincial guideline level) and are lower than most of the other 27 subwatersheds of the Upper Thames River watershed. *E. coli* bacteria levels have remained fairly steady since 2015 and are similar to the Upper Thames River watershed average. Recent nitrate levels (sources include fertilizer and waste) are below the provincial aquatic life guideline. Metals such as lead, copper, and zinc are below provincial aquatic guidelines. Since 2000, chloride levels (mainly from road salt) have shown an increasing trend but are low, and well below the aquatic life guideline.

Komoka Creek has good riparian cover throughout much of the watershed and, in the lower reaches, excellent natural stream habitat and groundwater inputs. Benthic scores have remained steady after previous improvements.

Indicators	Komoka Creek					Upper Thames 2016-2020	Provincial Guideline	Indicator Description
	1996-2000	2001-2005	2006-2010	2011-2015	2016-2020			
Phosphorus (mg/l) *	No data	0.032 C	0.032 C	0.025 B	**0.040 C 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 *E. coli*/ 100 ml) **	No data	304 D	288 C	167 C	**219 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)	6.07 D	6.26 D	6.03 D	5.45 C	**5.48 C 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 Komoka Creek, the White Sucker provides an important role in stream health. Spawning involves two or more males congregating around a female, triggering her to release up to 10,000 eggs. A portion of eggs can become fertilized by the nearby males, but they are also a significant food source for stream inhabitants. In fact, White Sucker eggs can make up more than 25% of the diet of fishes during the spring spawning season.

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: C Steady

2022 Watershed Report Card

Forest Conditions

Forest conditions in the Komoka Creek watershed have been fairly steady since the last watershed report card and score an overall grade of C. It should be noted that some of the change is due to improved mapping methods and boundary corrections.

The amount of forest cover (19.8%) has decreased slightly from 19.9% in 2017, primarily due to watershed boundary corrections. The small size of this watershed somewhat skews comparisons with other watersheds. The Environment Canada (EC) guideline for southern Ontario for sustaining species and water quality is a minimum of 30% forest cover. Meadows and other habitat types add another 7.2% for a total of 27% natural cover.

The amount of forest interior (2.4), is low, but higher than the Upper Thames River watershed average. There are some–but not enough–large woodlots to provide habitat for area sensitive birds such as Scarlet Tanager and Ovenbird. The EC guideline for southern Ontario is 10% forest interior.

The percent riparian zone forested (44.3%) is unchanged since the last report card in 2017, and is close to the guideline of 50%. Additional riparian areas are in permanent meadows and thickets (16.0%) for a total of 60.4% riparian zone vegetated.

Indicators	Komoka Creek 2022*	Upper Thames Average 2022*	EC Guideline **	Indicator Description
% Forest Cover	**19.8 C**	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	**2.4 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	**44.3 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	<1
2006-2010	<1
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 1-2 ha of forest were cleared in the previous 10 years.

Forest Area Gained

Years	ha
2010-2015	8

New data shows that approximately 8 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.

Great-crested Flycatchers nest locally in tree cavities in mature forests. Photo: Sharon Nethercott

2022 Watershed Report Card

Groundwater

Municipal Water Supply

Since 2010, Komoka and Mount Brydges no longer use groundwater from municipal wells. A pipeline supplies water from Lake Huron through the Lake Huron Primary Water Supply System.

Private Wells

Approximately 400 private wells are on record in the Komoka Creek watershed, the majority drawing groundwater from overburden aquifers rather than bedrock. 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

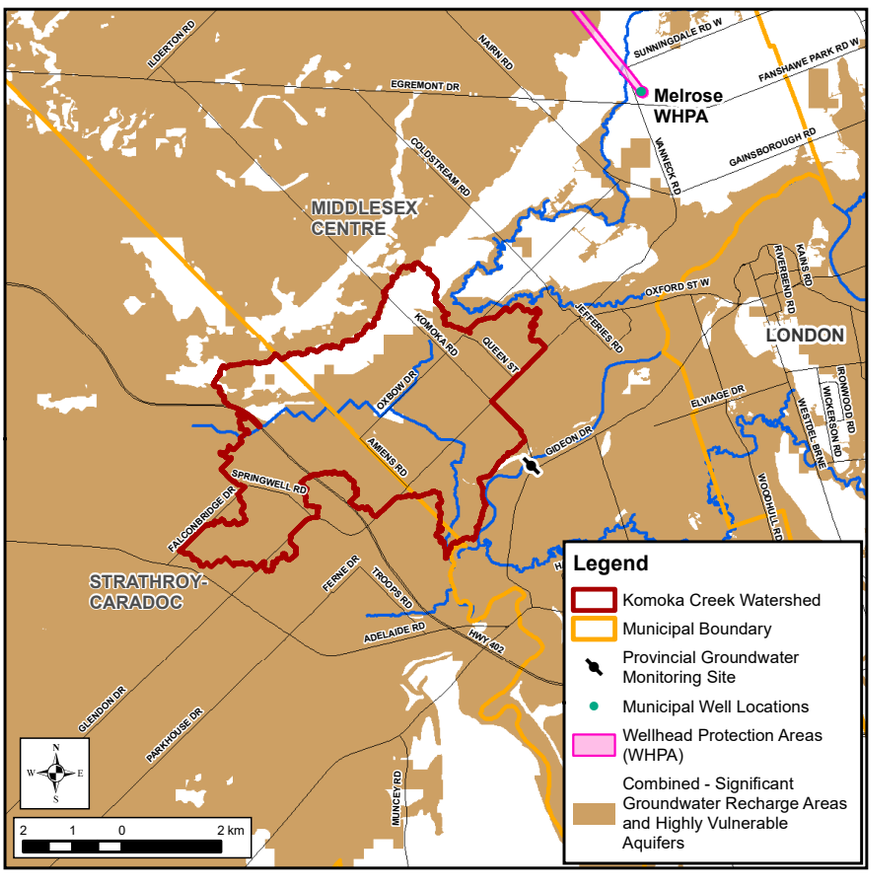
The Provincial Groundwater Monitoring Network has shown groundwater levels generally decline from May to October and increase (recharge) from late fall to early spring, with the largest increase in March (up to 1.5 m change). Recent data shows the recharge period is shifting later to November to May, 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)
- Upper Thames River Source Protection Area Approved Assessment Report (Thames-Sydenham Source Protection Region, 2015)
- Middlesex Natural Heritage Systems Study (Middlesex County, 2014)
- Comprehensive Review of Settlement Area Designations in the Middlesex Centre Official Plan (Middlesex Centre, 2011)
- Komoka Community Surface Water Plan (Aquafor Beach, 1999)

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).
- Ensure protection of water quality in old gravel pit ponds. These deep ponds are a direct connection to groundwater in the area.
- 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).
- In Komoka and Mount Brydges, continue the following actions:
  - For new development, implement urban stormwater planning using Low Impact Development (LID), stormwater BMPs, subwatershed studies, catchment area planning, and erosion control.
  - Incorporate LID into the planning process and promote the implementation of LID techniques, including in Master Plans, Secondary Plans, and any subwatershed studies.
- Consider using a water balance and landscape approach for inbuilt and new development to manage stormwater runoff.
- Maintain base flow to natural heritage features through water balance.
- For existing development, implement pollution prevention and control planning for all aspects of stormwater runoff including combined storm-sewer overflows.
- Continue to upgrade sewer systems where risk of contamination is greatest (e.g., extend sanitary sewers to urban properties on septic systems).
- Minimize use of fertilizers, adhere to Ontario's Cosmetic Pesticide Ban, and utilize the municipal hazardous waste disposal program.

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

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 along Komoka Creek and its tributaries.
- Naturalize retired aggregate pits to create unique habitats and protect water quality.
- 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.
- Connect isolated 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 Komoka Creek watershed is in the Thames River watershed, which is part of the Lake Erie watershed. Water from Komoka Creek enters the Thames River downstream in London and takes 4-10 days to flow through 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 Komoka 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:

- Watershed landowners completed three Clean Water Program (CWP) projects including fragile land retirement/reforestation. The CWP was initiated in 2001 as a partnership between local municipalities to fund environmental projects (www.cleanwaterprogram.ca). 16 projects have been completed between 2001 and 2020.
- Many municipalities in the Upper Thames River watershed are taking action on climate change. For instance, the Middlesex Centre Strategic Plan 2021-2026 notes: “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”.
- Over the past several years, UTRCA staff has worked with Camp Kee-Mo-Kee on various projects including erosion control, safe access, and forest management.

Vegetation cover along Komoka Creek improves water quality by filtering runoff and stabilizing banks.

Over 2500 trees were planted at seven sites in the Komoka Creek watershed through the UTRCA’s Private Land Reforestation Program.

Good populations of Brown Trout (above) and Rainbow Trout are found in Komoka Creek. These game fish have been stocked by the Thames River Anglers. The native Brook Trout has also been recorded, but not in large numbers. Brown Trout were introduced into many Ontario streams from Europe in the 1800s and are now naturalized in many areas.

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