



**2016 ANNUAL REPORT | KETTLE CREEK CONSERVATION AUTHORITY**

## What is a watershed?

A watershed is an area of land drained by a creek, river or stream into a larger body of water. Similar to the branch of a tree, creeks empty into streams, which then empty into larger streams, eventually forming one main trunk. In the Kettle Creek watershed there are three subwatersheds that drain into Lake Erie. Everything is connected in our watershed. What we do on our landscape influences our rivers, streams, beaches and eventually, our Great Lakes. In other words, actions which take place at the top of the system can and do affect those downstream.

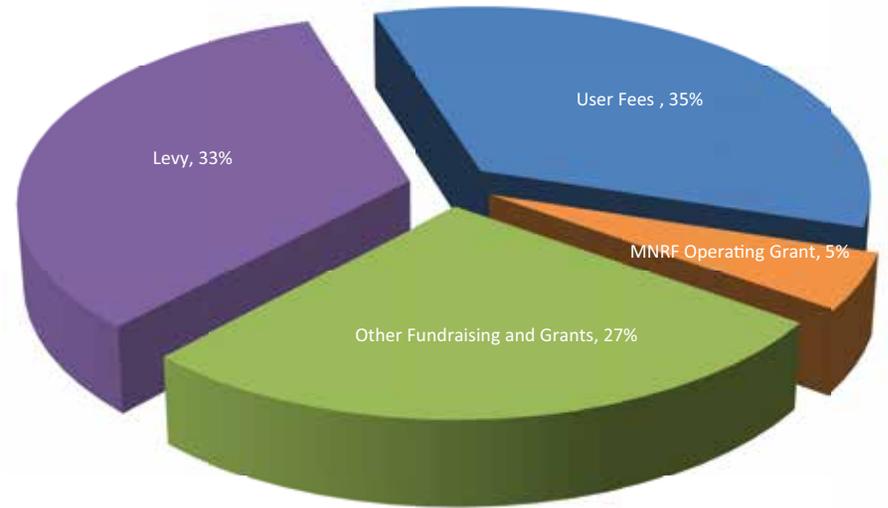
## The Kettle Creek Watershed

Situated entirely within the Carolinian Life Zone, the Kettle Creek watershed drains 520 square kilometres of agricultural, urban, and naturally vegetated lands to the north shore of Lake Erie at Port Stanley. Kettle Creek drops approximately 141 metres over its 80 kilometre length. The steep drop in elevation can cause flash flooding, fluctuating base flows and a high degree of erosion. The watershed is hourglass in shape and is made up of three subwatersheds: Dodd Creek, Upper Kettle Creek and Lower Kettle Creek. The main branch of Kettle Creek originates at Lake Whittaker, an 11 hectare groundwater-fed kettle lake. The physical geography of the Kettle Creek watershed is dominated by clay plain in the north and sand plain in the south. There are seven member municipalities associated with the Kettle Creek watershed: Middlesex Centre, London, Thames Centre, Malahide, Central Elgin, Southwold and St. Thomas.

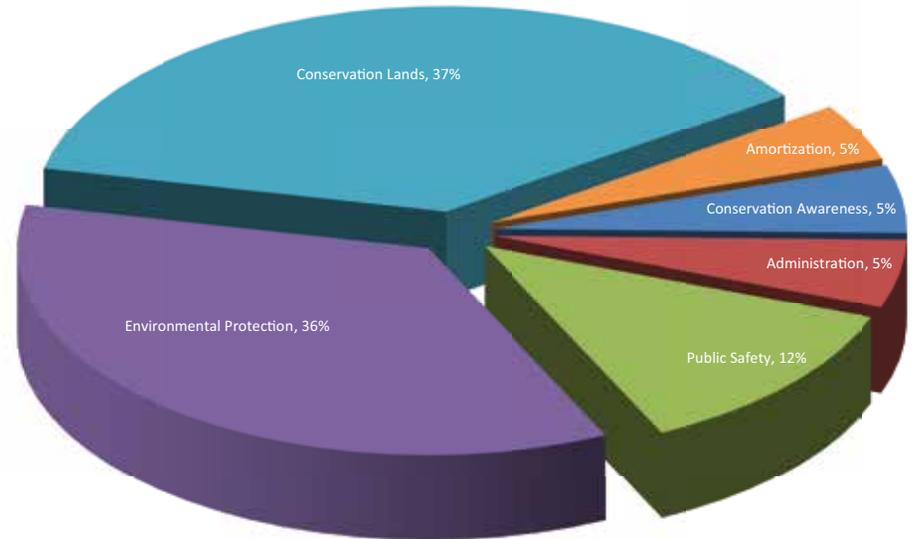


# Financial Statements

## Total Revenues



## Total Expenditures



Full financial statements are available at [www.kettlecreekconservation.on.ca](http://www.kettlecreekconservation.on.ca)

# Flood Forecasting and Low Water Response

KCCA works closely with local municipalities and the media to keep local residents and businesses current on watershed conditions that may be conducive to riverine flooding, storm surges, and ice jams. KCCA staff use a network of stream gauges, precipitation gauges, weather stations, and lake level recorders to monitor water levels and flow throughout the watershed.

In 2016, the Kettle Creek watershed received a reprieve from the intensely cold “deep freeze” winters of 2014 and 2015. A persistent “super” El Niño and shrinking Arctic sea ice were the main contributors to the second warmest winter since country-wide records began in 1948. Unfortunately, the lack of a significant snow pack over the winter months resulted in a spring freshet that only temporarily boosted water levels before a drought took hold in the summer.

The drought of 2016 impacted reservoirs, creeks and streams throughout the watershed and across Ontario. Through the winter months of January to March 2016, all three subwatersheds maintained water levels and flows above the low water triggers. In mid-March, the spring freshet caused a normal seasonal spike in water levels that lasted until mid-April, when water levels suddenly dropped across all three subwatersheds. Water levels from that point on were lower than normal and remained low for the rest of the summer and well into fall. KCCA issued a Level 1 Low Water Condition on July 20, 2016 asking residents to voluntarily reduce their non-essential water use by 10%.

The seasonal thunderstorm and rain events, typical in the area during the fall months did not materialize, which required KCCA to issue a Level 2 Low Water Condition on October 13, 2016. Under a Level 2 Condition, residents are asked to further curb their non-essential water use by 20%. The last time KCCA declared a Level 2 Low Water Condition was in August 2012. Unlike other communities, the majority of residents in the Kettle Creek watershed receive water from the Lake Erie pipeline and do not

consume groundwater directly. Consequently, restricting water consumption in drought conditions does not have a significant impact in the Kettle Creek watershed. It is important that watershed residents understand that decreased flows in Kettle Creek may not affect the amount of water available for human use but it does affect water available to ensure healthy aquatic life.

The Kettle Creek watershed was not as hard hit as other Conservation Authorities, particularly those in Eastern Ontario where Level 3 Low Water Conditions were declared at the beginning of summer and were maintained into 2017. By the end of 2016, water levels in the Kettle Creek watershed were finally exhibiting weak positive trends and are expected to recover in early 2017.

KCCA’s watershed is prone to extensive erosion due to its steep terrain that causes high water events to move swiftly through the system. Consequently, large trees including their attached roots often find their way into our bigger tributaries and creeks where some become lodged in our dams. In spring 2016, KCCA staff had the daunting task of removing huge vegetation and tree debris mass that had accumulated along the upstream side of Dalewood Dam. Normally, staff are able to move the debris over the spillway using a variety of strategies and tools. However, this time the trees were just too big. To assist with the operation, KCCA made use of a tow truck winch to help move the logs to the banks, which were later cut up and hauled away. Staff are investigating the possibility of purchasing a tractor operated winch in the future to assist with log and debris removal at Dalewood and Union Dams.

For up-to-date flood information, watershed residents and businesses can visit the authority’s website [www.kettlecreekconservation.on.ca](http://www.kettlecreekconservation.on.ca) where they can register to receive automatic flood related emails, or connect with KCCA socially on Twitter @KettleCreekCA, or on Facebook [www.facebook.com/KettleCreekCA](http://www.facebook.com/KettleCreekCA).





*Dalewood Dam during Spring high flow event*



*Wetland Explorers Program*



*Wetland Explorers Program*



*Forest Festival Public Day*





## Outreach and Education

In July and August 2016, KCCA staff had the opportunity to work with the STEM Camp organization. The STEM Camp mission is to inspire youth through participating in hands-on activities in the areas of Science, Technology, Engineering, and Mathematics (STEM). Authority staff taught 11 summer STEM camps from St. Thomas, London, Ingersoll, Tillsonburg, Woodstock, and Strathroy about the importance of wetlands in the Kettle Creek watershed. The campers participated in an interpretive nature hike to the Dan Patterson wetland and explored live critters from the bottom of Kettle Creek which are used as indicators of local environmental health. The kids also got to play some fun games like Eagle Survivor and Camouflage Hunt. Students were able to discover that a healthy environment is important to everyone—industry and residents alike.

In October 2016, KCCA staff presented the Source Water Protection In-Class Education program to two Grade 8 classes at Locke's Public School in St. Thomas. Students had the opportunity to learn about watersheds, where our drinking water comes from, and the importance of keeping our source water safe from contamination.

KCCA worked with Fanshawe College to host two students in the Recreation and Leisure Services Program for a four week placement. The two students worked on creating a four-week summer day camp program for Dalewood and Lake Whittaker campgrounds. KCCA staff also hosted a

Westervelt College student for a six-week placement. The student was instrumental in assisting the Water Conservation Supervisor in the various environmental monitoring programs.

In 2016, KCCA unveiled its new outdoor education amphitheatre created with funding from the Canada 150 Community Infrastructure Program. The funds were also used to create two accessible parking spots, implement upgrades to the picnic pavilion exterior and interior facades, install a new granular trail to connect the picnic pavilion to the existing wetland trail and to create signage to illustrate the historical significance of the Dan Patterson cabin.

The Carolinian Forest Festival was held October 4 to 6 with over 1,500 grade 6 and 7 students attending from across Elgin, Middlesex, and Oxford Counties, including St. Thomas and the City of London. The Festival showcased 37 hands-on activities that illustrated the importance of the Carolinian Life Zone, species at risk, stewardship and conservation, and climate change. After the success of the 2016 Public Day, the Festival was opened up again to the community on October 8 at the Jaffa Environmental Education Centre. The Public Day consisted of Forest Festival activities, live species at risk presentations, archery, kids' activities, and guided hikes. Over 500 community members attended the Public Day supported by 30 volunteers.

## Planning and Regulations

In partnership with its member municipalities, KCCA works towards ensuring life and property is protected from flooding and erosion hazards by encouraging new development to occur away from hazard prone areas. KCCA staff provided input into over 100 land use planning and development applications and issued 40 permits under Ontario Regulation 181/06. In addition, one Notice of Violation was issued in 2016.

## GIS/IT

Projects were completed for the Grand River Conservation Authority, Elgin St. Thomas Public Health, Saugeen Valley Conservation Authority, Long Point Region Conservation Authority, and the County of Elgin. The department was also awarded two grants from NRCan and OMAFRA, respectively. The NRCan grant was part of the Green Jobs Initiative, which is part of their Science and Technology Internship Program. The GIS Intern was tasked with updating KCCA's hydrology, woodlots, and wetland data. The OMAFRA grant will be used to conduct hydrological mapping throughout three watersheds, develop a gully erosion monitoring program using low altitude aerial photography, and further develop and update a Best Management Practices (BMP) database.

KCCA began planning for IT upgrades in 2017 and provided technical input to facilitate the transition to a new campground management system. Staff also migrated the seasonal job application to the KCCA website.

Staff sit on the provincial Elevation Coordination and Consultation Committee (EC3), a group that brings together elevation experts from all relevant ministries and partner agencies to provide coordination and expertise on elevation data related projects, acquisitions, and issues. Further, KCCA is also an active member of the Western Ontario Conservation Authority GIS/IT user group and an active member of several working groups. In June 2016, staff gave two presentations to colleagues from other CAs at the annual Conservation Authority Collaborative Information Session (CACIS) conference in Guelph.



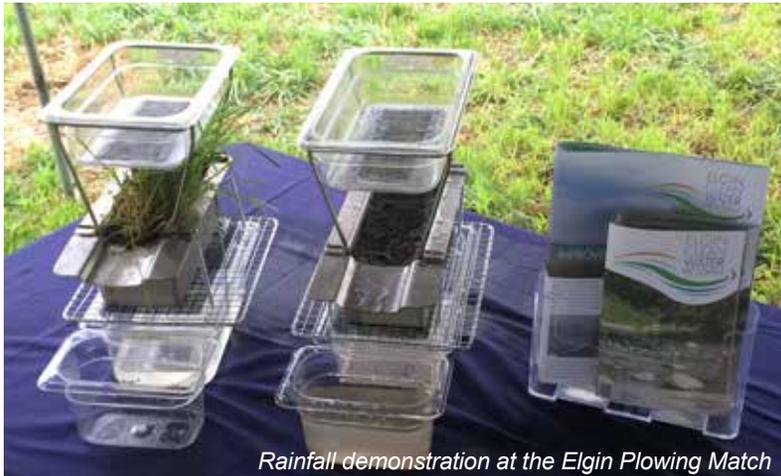




*Wetland creation*



*Monsanto Gives Back*



*Rainfall demonstration at the Elgin Plowing Match*





## Stewardship

KCCA partnered with Ontario Power Generation (OPG) and the Upper Thames River Conservation Authority (UTRCA) to increase wetland coverage across the Kettle Creek and Upper Thames River watersheds. With the support of Ontario Power Generation's Regional Biodiversity Program, 10 wetlands will be restored each year over the next three years for a total of 30 wetlands by the end of 2018. Ten wetlands were created or enhanced in 2016 exceeding 11 acres in habitat created.

Through the Great Lakes Agricultural Stewardship Initiative (GLASI) KCCA, in partnership with the three other Elgin County Conservation Authorities, are engaging local landowners to take positive actions to improve soil health and water quality. While the project continues until 2018, staff were busy attending local events and manning displays including the Elgin Soil and Crop Improvement Association Summer Tour and the Elgin Plowing Match. Staff also conducted a survey of farmers to help determine barriers to BMP implementation in Elgin County.

Employees from Monsanto London helped to remove invasive species such as European Buckthorn, Manitoba Maple, and Giant Ragweed from Dan Patterson Conservation Area as part of Monsanto Gives Back.

The Elgin Clean Water Program (ECWP) continues to be a great source of technical advice and funding for landowners. Elgin County and the Green Lane Community Trust Fund provided \$40,000 and \$35,000 in funding to the program respectively in 2016. Twenty-six projects were completed, totalling \$77,270 in ECWP grants and total project costs exceeding \$300,000. Since the ECWP's inception in 2012, 102 projects have been completed with total project costs exceeding \$1,225,000.

## Forestry

KCCA continued its partnership with Ontario Power Generation and the Upper Thames River Conservation Authority to plant 60,000 trees across the two watersheds in spring 2016. In the Kettle Creek watershed specifically, 50,000 seedlings were planted with an additional 2,450 seedlings sold to landowners through the Greening Communities program.

KCCA in conjunction with the Municipality of Central Elgin planted 260 native, large stock trees along municipal roadsides to replace those that have been lost over the years. KCCA partnered with the Ministry of Transportation to plant 1,500 spruce seedlings along Highway 401 to act as a living snow fence.

KCCA was successful in obtaining funding from the Great Lakes Guardian Community Fund to partner with local schools to green their grounds through tree planting. Five watershed elementary schools and one high school participated by planting 136 large stock trees and 50 seedlings in their yards. A class from Central Elgin Collegiate Institute also helped to plant 1,450 seedlings on a private landowner's property.

Two City of St. Thomas parks were the beneficiary of tree planting efforts in 2016. Members of the St. Thomas Railway City Rotary Club partnered with KCCA to plant 60 large stock trees at Massey Park and KCCA staff planted 100 large stock trees and shrubs along the banks of Kettle Creek at V.A. Barrie Park.

Staff renewed the Managed Forest Tax Incentive Program (MFTIP) Plan for 875 acres of Authority owned woodlots. MFTIP is designed to increase landowner awareness of forest stewardship and encourages responsible forest management in Ontario through a tax reduction.





*Elgin Court Public School students plant schoolyard trees*



*Post plant tending*



*KCCA staff plant trees at VA Barrie Park*



*Large stock trees ready for roadsides and parks*



*Pool at Dalewood Conservation Area*



*Halloween weekend*



*New playground at Lake Whittaker Conservation Area*





*Trilliums at the Lake Whittaker hiking trail*

## Conservation Areas

Dalewood and Lake Whittaker Conservation Areas continue to prove to be the destination of choice of vacations close to home. The popularity of these campgrounds continues to grow, booking to capacity on holiday long weekends. The revised special events program ran events like the Annual Fishing Derby in partnership with Kids, Cops and Canadian Tire Fishing Days, Carnival in partnership with Malahide Fire Services, and Halloween in partnership with Screampfield. The transferable camping permit between parks for day-use activities at all KCCA properties and facilities enable campers to attend these special events.

The campground communities of Lake Whittaker and Dalewood have made a concerted effort to raise money for playground structures at both campgrounds. Lake Whittaker's playground structure was installed spring 2016 and Dalewood's will be installed in 2017. The playground structure included multiple slides, spiderweb climbing, and an accessible swing set. KCCA continues to invest in the improvement of the Authority's infrastructure. The Dalewood pool reconstruction included: new plumbing and automatic chemistry control installed at both the wading pool and main pool, new deck and pump house, new fencing around the pool, and a new UV system at the wading pool.

KCCA challenged seasonal employees at both Dalewood Conservation Area and Lake Whittaker Conservation Area to impress customers with each interaction. In turn, customers were asked to provide feedback on staff's performance. At the end of the camping season, management considered the customer feedback, attendance, and overall performance of each seasonal employee to determine a KCCA Ambassador of the Year. Emily Gillies was named Ambassador of the Year for Lake Whittaker Conservation Area and MacKenzie Curtis received the honour at Dalewood Conservation Area.

The effects of Emerald Ash Borer is evident in all of KCCA's forests and Dalewood and Lake Whittaker Conservation Areas as over 250 ash trees were removed due to safety concerns.

# Watershed Report Card Spotlight on Benthic Macroinvertebrate Monitoring

Benthic macroinvertebrates are organisms without backbones that can be seen with the naked eye, that live on, under, and around rocks and sediment on the bottoms of lakes, rivers, and streams. Typical benthic invertebrates are animals such as snails, crayfish, clams, leeches, worms and the larval stages of many families of insects such as dragonflies, mayflies, stoneflies and beetles that spend some or all of their lives in water.

These organisms are often used to monitor water quality as they are present throughout the watercourse in many different types of habitat and they have limited mobility which makes them vulnerable to many creek stresses, including the physical, chemical and biological conditions of the stream. In addition, they have short life cycles, are easily collected and identified all year round, and they show a wide range of tolerances to various degrees and types of pollution. Furthermore, their presence or absence within a specific location can identify isolated events or incidents of contamination that can be missed by analysis of the water column.

Since 2006, KCCA staff have waded and kicked-and-swept their way through hundreds of local creeks and streams during hot, cool, wet and dry years, collecting hundreds of benthic samples to monitor how those aquatic environments have changed over time. KCCA monitors 10 baseline sites every year and between five and 10 additional “areas of interest” sites that rotate by subwatershed every three years. Invertebrate samples are preserved in the field and then analyzed in the lab over the winter months to determine the type and number of invertebrates down to the family level at each location. Staff use a variety of invertebrate keys and books with the help of a microscope to identify the creatures collected in the field.

Once the sample has been analyzed, a calculation can be made to determine a modified Family Biotic Index (FBI) which indicates the health of the watercourse. Other information, such as family richness (the number of different invertebrate families) and %EPT (the percentage of mayfly (E), stonefly (P) and caddisfly (T) groups of insects that are very sensitive to pollution) is calculated to provide further insight into the conditions of the stream or creek. Each FBI value has a corresponding letter grade which is used in the Watershed Report Card process as part of the surface water quality indicator.

Data collected over the last five years suggests that the Dodd Creek subwatershed is experiencing a decline in water quality at two of the three long-

term monitoring stations. This subwatershed is heavily agricultural with very little forest and wetland cover and the bottom substrates of Dodd Creek tend to be mainly silt, sand and a little gravel with very few riffles that are subjected to extremes in flow. As a result, the species’ richness tends to be lower with fewer EPT families and predominated by pollution tolerant groups such as midges and snails.

Unfortunately, all sites in the Upper Kettle Creek subwatershed are exhibiting a negative trend, suggesting a decline in water quality over the last five years. Several factors could contribute to this decline, including the very dry year that the watershed experienced in 2016. In addition, the Upper Kettle Creek subwatershed experiences high levels of erosion and sedimentation, which can affect water clarity, and transport pollution downstream, reducing the number of pollution sensitive species found in the benthic samples.

On a positive note, almost all long-term monitoring sites in the Lower Kettle Creek Subwatershed are exhibiting a positive trend, suggesting an overall improvement in water quality in the last five years. One of the site’s five-year median grades improved from F (Poor) to D (Fairly Poor) water quality in data collected from 2012-2016. However, the improvements are tenuous, so we must continue our efforts to plant trees, implement riparian improvements and best management practices to ensure that those positive gains are not wasted.

In some ways, this data may be interpreted as a bleak outlook for the watershed, but all is not lost! With the implementation of many rural stewardship initiatives in the watershed, many on the ground (and in the water) projects will hopefully reverse this decline. Projects to increase wetlands throughout the watershed are a priority and managing surface water runoff from agricultural and industrial lands through the use of riparian plantings will help to improve water quality downstream.

Long-term monitoring of benthic macroinvertebrates are like the canary in the coal mine—changes in the benthic community can be an indication that something is wrong and steps need to be implemented to make improvements. While the bugs that live in the muck at the bottom of our creeks and streams may appear alien, their inclusion in the environment provides a wealth of information which can direct and support our environmental decision-making and management practices. They are more than just tiny bottom dwellers, they are indicators of aquatic health.

### Flat-head Mayflies (Heptageniidae)

The “Flat-head mayflies” are named due to their much flattened appearance. All mayfly larvae are aquatic with terrestrial adults and are an important source of food for fish. Usually, the adult lives for only 1-2 days and therefore does not possess functional mouthparts. Mayflies are often an indicator of good water quality as most species are relatively intolerant of pollution. This family of mayflies is found in several locations throughout the watershed, usually where there are riffles combined with pebbly or rocky bottoms.



### Water Pennies (Psephenidae)

Water Pennies are aquatic beetles where the young resemble small pennies. They are very flat and are typically found in riffles in streams clinging to the undersides of rocks or logs. They feed on algae that they scrape off of rocks and they breathe through feathery gills located on the base of their abdomen. These beetles are uncommon throughout the watershed and are pollution sensitive.



### Crayfish (Decapoda)

Crayfish are freshwater crustaceans distinguished from other aquatic invertebrates by having 10 pairs of legs including one pair modified into pincers. These invertebrates are a significant link in the complex aquatic and terrestrial food webs in our ecosystem. Crayfish are extremely hardy animals that can tolerate a wide range of water temperature, however they are somewhat sensitive to pollution. A rich crayfish population is a positive index of water quality. Crayfish are found throughout the watershed in many different habitats.



### Dragonflies (Anisoptera) & Damselflies (Zygoptera)

There are many families of Dragonflies and Damselflies within our watershed and all are excellent predators. The larval stage, or nymph are “sit-and-wait” predators which means they wait motionless until a tasty invertebrate, small fish or tadpole comes close enough to grasp by a lightning fast extension of its lower lip (or labium). While dragonfly nymphs tend to be large and fat and damselfly nymphs are long and slender, all are voracious predators. These insects tend to be somewhat sensitive to pollution and can be found in good or fair water quality in the watershed.



### Net-spinning Caddisflies (Hydropsychidae)

Net-spinning caddisfly larvae build a home composed of plant and mineral fragments where they spin a net made of fine silk that they use to catch algae, detritus and smaller invertebrates that flow by to eat. Typically, caddisflies are pollution sensitive and this family is found throughout the KCCA watershed.



### Water Scorpions (Nepidae)

Water scorpions are exclusively aquatic true bugs that are predators with long raptorial forelegs, similar to praying mantids, which they use to catch other invertebrates, small fish and tadpoles. They are often “sit-and-wait” predators where they can keep their long breathing tube in contact with the water surface.



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