

# 2013 WATERSHED REPORT CARD



Kettle Creek  
Conservation Authority

OVERALL WATERSHED GRADE

C

The Kettle Creek watershed received an overall "C" average, based on surface water quality, groundwater quality, and forest conditions. This means that the health of the watershed remains fair.

INDEX

Report Card Process	4
Surface Water Quality	7
Groundwater Quality	8
Forest Conditions	9
Wetland Conditions	10
Watershed Monitoring Sites	11
Dodd Creek Subwatershed	12
Upper Kettle Creek Subwatershed	14
Lower Kettle Creek Subwatershed	16
Our Conservation Story	18
What Can You Do?	19

**22KM** OF HIKING TRAILS

Lake Whittaker is the headwaters - an **11** hectare groundwater-fed kettle lake

**<1%** WETLAND COVER : Kettle Creek Watershed is **520km<sup>2</sup>** : **11 FULL TIME STAFF**

**7 Member Municipalities** : Middlesex Centre, London, Thames Centre, Malahide, Central Elgin, Southwold, St. Thomas


**3 subwatersheds:** *Dodd Creek, Upper Kettle Creek, Lower Kettle Creek* : **AGRICULTURAL LAND USE 83%**

 **45,000** watershed residents : **LARGEST POPULATION CENTRE IS ST. THOMAS 71%**

*Largest reservoir is the Dalewood Reservoir*

 **52 species of fish**

**>150 species of breeding migratory birds** :  **15% Forest Cover**

 **112K** residents receive their drinking water from Lake Erie

**KCCA HAS 25KM OF LAKE ERIE SHORELINE**

*Lake Erie has the fastest eroding shoreline in the Great Lakes at an avg. rate of more than 2 m/year.*

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.

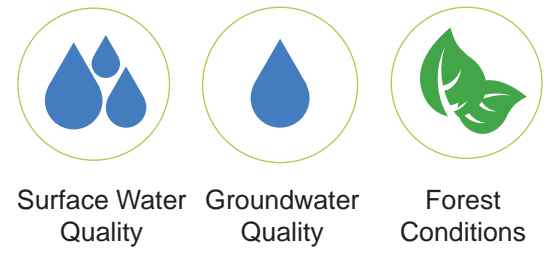
# WHY MEASURE?

A Watershed Report Card is a key component of watershed management. Measuring and reporting on watershed health allows for program goal setting and evaluation, targets program funding for best results, tracks progress over time and demonstrates conservation authority accountability. A watershed report card evaluates key indicators of watershed health, using provincial standards, and distributes those findings to local residents, private landowners and stakeholders who are concerned about the health of their watershed. It also helps us identify healthy and ecologically important areas that require protection or enhancement.

# REPORT CARD PROCESS

For the purposes of the report card, the Kettle Creek watershed was divided into three subwatersheds: Dodd Creek, Upper Kettle Creek and Lower Kettle Creek.

Each subwatershed was assessed using three environmental components, each made up of at least two indicators of quality and/or quantity to provide an overall evaluation of watershed conditions. These components relate to two key Conservation Authority business functions: protecting and enhancing water quality and preserving and managing natural areas. The three environmental components are:



Kettle Creek Conservation Authority (KCCA) aims to release a watershed report card every five years. The first watershed report card was released in February 2009, and reported on data collected between 2003 and 2007. The 2013 Watershed Report Card summarizes data collected in the KCCA watershed from 2008-2013.

The report card is intended to provide local residents, community groups, municipalities, industries and agencies with information so they can take actions to protect or enhance the environmental features of the watershed.



# WATERSHED TRENDS

Comparing results from the 2008 Watershed Report Card with the 2013 Watershed Report Card, the Kettle Creek Watershed has maintained a solid C average with respect to surface water quality, forest conditions and groundwater quality.

This means that despite KCCA's efforts, the health of the watershed remains fair. An average grade can be construed both positively and negatively. It is evidence that partnerships between KCCA, the community, government and corporate leaders to create conservation solutions to improve on-the-ground conditions are working – the Kettle Creek watershed is as healthy as it was five years ago. On the other hand our efforts have not yet resulted in measurable improvements.

Five years is a very short time in watershed health. For instance, KCCA planted one million trees in the last eleven years and yet there is little measurable improvement in the forest condition scores between 2008 and 2013 (page 9). However, forests grow slowly. Before newly planted trees can be considered forest cover, they must be more than 4 metres tall and have sufficient canopy. Our new plantings are still young and we may not see measurable improvements of today's efforts for another 10 years.

# OUR FOCUS



Wetland Conditions

In this Watershed Report Card KCCA has chosen to assess our wetland conditions as a stand-alone measure. Wetland health is measured

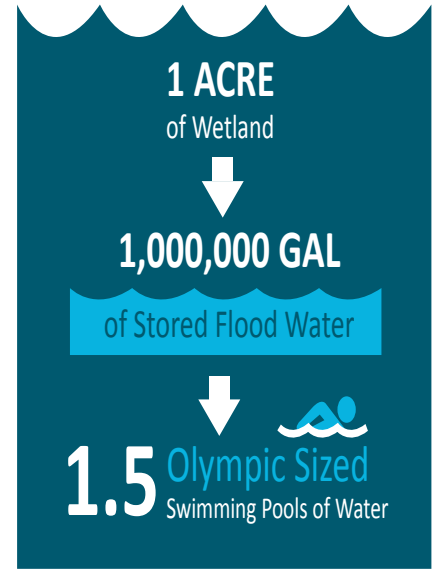
by calculating the percentage of the watershed that is in wetland cover. Percent wetland cover should be a stand-alone measure because it is difficult to get extensive and accurate wetland mapping.

What we do know is that the KCCA watershed has less than 1% wetland cover, which is much less than the recommended 10% by Environment Canada. Over the next five years KCCA is committed to exploring avenues to increase wetland preservation and creation in the watershed. In 2013, the Kettle Creek Clean Water Initiative provided financial assistance for the creation of two wetlands in the watershed and additional wetlands will be created or enhanced thanks to a donation from the Estate of Dorothy Fay Palmer. KCCA plans to continue their fundraising efforts, public awareness and education campaigns to encourage other landowners to undertake a project on their properties.

The data in this Watershed Report Card also tells us that erosion, sedimentation and nutrient loading are still significant areas of concern for the Kettle Creek watershed.

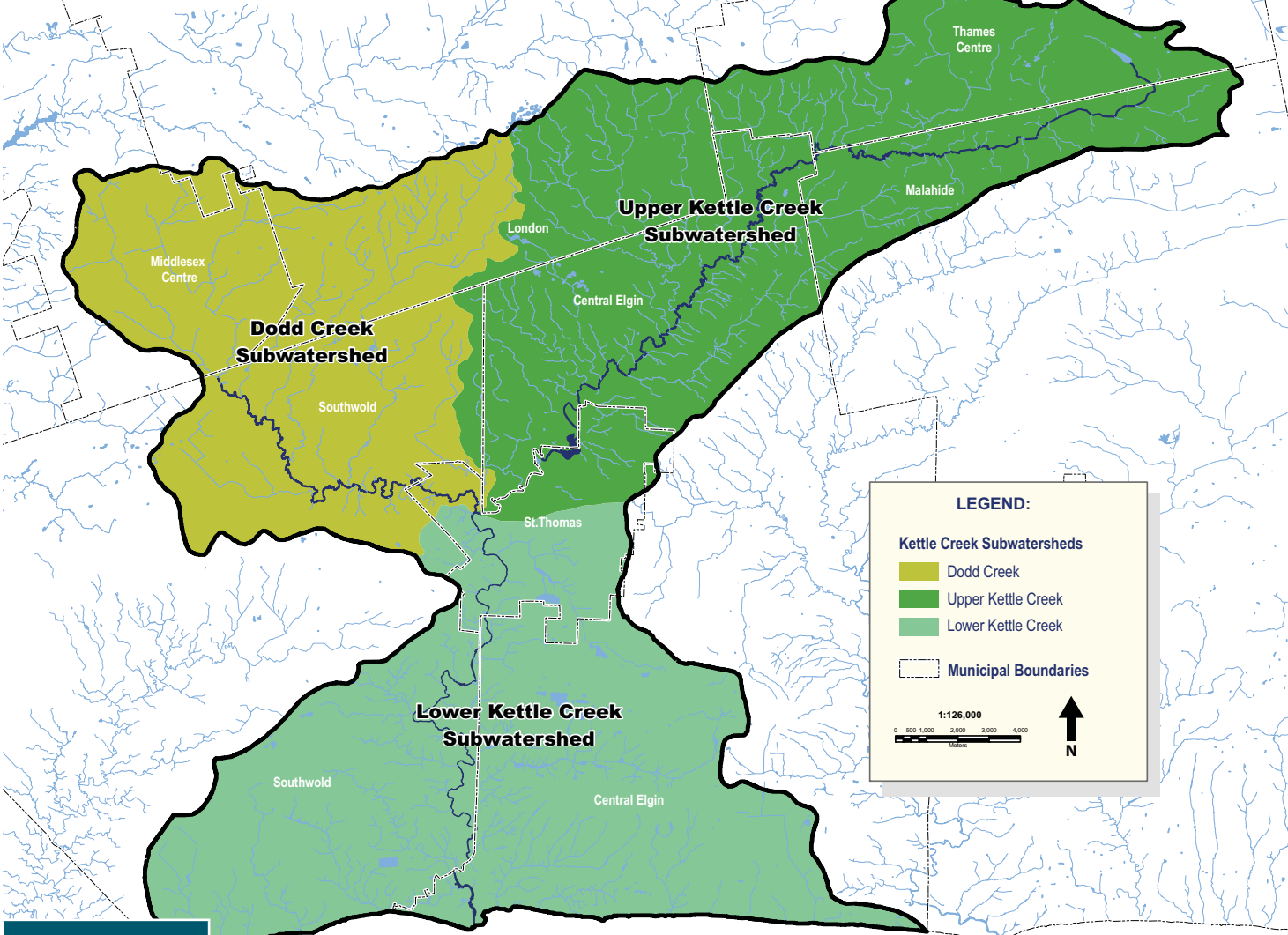
Over the past five years 95% of all water quality samples collected exceeded the Provincial Water Quality Objective for total phosphorus. Phosphorus can lead to low oxygen levels, excessive algae blooms and impaired aesthetics in water. The sources of phosphorus are varied (agriculture, municipal, residential) but it usually enters our waterways through runoff.

Over the past five years KCCA has built a comprehensive stewardship program to address these issues by offering financial incentives to landowners to undertake best management practices on their lands, leveraging over \$500,000. Through the Elgin Clean Water Program and the Kettle Creek Clean Water Initiative, KCCA will continue to build its capacity to target stewardship projects on the landscape for best results.



Water quality sampling on Lake Whittaker.

# KETTLE CREEK SUBWATERSHEDS



## GRADING

- A** Excellent
- B** Good
- C** Fair
- D** Poor
- F** Very Poor

## STANDARDS

The standards used in this report card were developed by Conservation Authorities to ensure consistent reporting across the Province of Ontario and are intended to provide watershed residents with information to protect, enhance and improve the precious resources that surround us. These standards have been followed as best as the data allows. Unless otherwise indicated, the data represented in this report card is from 2008-2013.

## HEALTH TRENDS

- Improving ↑
- Steady ↔
- Declining ↓

# SURFACE WATER QUALITY



There are nine surface water quality monitoring stations located throughout the watershed (page 11). KCCA partners with the Ministry of the

Environment (MOE) through the Provincial Water Quality Monitoring Network (PWQMN) to sample four sites. Several indicators of surface water quantity and quality are studied including: streamflow, nutrients, bacteria and benthic invertebrates.

Surface water quality grades in the Kettle Creek watershed range from D to C (poor to fair). These low grades are due primarily to high phosphorus concentrations and low benthic indicator scores. The best water quality grades were achieved in the Upper Kettle Creek subwatershed. Phosphorus loading is the number one issue facing water quality in the Kettle Creek watershed as well as other water quality stressors from non-point sources (agricultural/livestock runoff and faulty septic systems) and point sources such as urban stormwater. A decline in water

quality impacts aquatic wildlife, increases drinking water treatment costs and negatively impacts recreational use such as swimming and boating.

**SURFACE WATER QUALITY GOAL:** Stewardship activities that focus on sediment and erosion control, protecting and creating wetlands and enhancing riparian zone cover will help to improve surface water quality throughout the watershed.

9

MONITORING STATIONS

95% of all water samples collected in the last 6 years exceed the PWQO for Total Phosphorus

Indicator and Description	Dodd Creek		Upper Kettle Creek		Lower Kettle Creek	
	Result	Grade	Result	Grade	Result	Grade
<b>Total Phosphorus</b> is a nutrient that binds to soil particles and thus is an indicator of sedimentation, erosion and contaminants that are carried to the stream through surface runoff. High concentrations of phosphorus can lead to low oxygen levels, excessive algae blooms and impaired aesthetics.	0.182 mg/L	D ↑	0.147 mg/L	D ↔	0.200 mg/L	F ↔
<b>Benthic Invertebrates</b> are excellent indicators of water and sediment quality. Benthos are easily collected, they are sedentary in nature and live in a variety of habitats. The Family Biotic Index summarizes the species and quantities of benthics in a sample.	5.9	D ↔	5.7	C ↔	5.8	D ↔
<b>E. coli</b> bacteria are found in human and animal waste. E. coli found in a water sample is an indication that other fecal contamination and disease causing bacteria may be present. The Provincial Water Quality Objective (PWQO) for recreational water use is 100 CFU/100ml.	265 CFU/100ml	C ↔	97 CFU/100ml	B ↔	109 CFU/100ml	C ↔
<b>Overall Grade</b>	D ↔		C ↔		D ↔	

Surface Water Data Source Partners: Ontario Ministry of the Environment - Provincial Water Quality Monitoring Network

# GROUNDWATER QUALITY

Groundwater is the water found below the earth's surface in the soil, wells, porous rocks and aquifers. Seven monitoring wells are used to collect groundwater data in the Kettle Creek watershed (page 11). Water samples are collected each spring and fall and are tested for a variety of parameters including: nutrients, metals and bacteria.

The KCCA monitors groundwater quality and water levels in partnership with the Ministry of the Environment's Provincial Groundwater Monitoring Network (PGMN). The water quality is excellent at all PGMN wells in the

Kettle Creek watershed. Most of the wells tested are naturally protected by a thick layer of clay. There are close to undetectable concentrations of nitrate and nitrite and low chloride levels. Groundwater levels at most PGMN wells vary seasonally with their highest water levels being observed during the late winter and spring but drop during the dry summer months.

**GROUNDWATER QUALITY GOAL:** Stewardship activities that focus on protecting our groundwater resources, such as properly decommissioning unused wells and upgrading old wells will help to prevent contaminants from entering source water aquifers.



# FOREST CONDITIONS

The bulk of the watershed's forest cover is generally found on lands that are unsuitable for agriculture or development and are located in small fragmented pockets throughout the watershed.

Forest condition grades for the Kettle Creek watershed range from D to C (poor to fair) due to the lack of forest interior found throughout the watershed. The Dodd Creek and Upper Kettle Creek subwatersheds both scored a D, while the Lower Kettle Creek subwatershed scored a C. Small overall improvements were seen throughout the watershed due to improved mapping and GIS techniques.

Forest conditions are stressed because the Kettle Creek watershed is located in a highly agricultural part of southwestern Ontario. Most of the woodlands in the Kettle Creek watershed are small, narrow, concentrated in valleylands and do not contain interior forest habitat. Woodlands need to be over 200 metres in length and width (4 hectares in area, assuming a square shape) to contain forest interior and this is lacking in the Kettle Creek watershed.

**FOREST CONDITIONS GOAL:** Tree planting efforts focus on increasing the size of established woodlots to increase forest interior, as well as increasing connectivity between existing woodlots to increase wildlife corridors.



**7** MONITORING WELLS

**72** samples analyzed **>50** different parameters

LAST **6** YEARS CONCENTRATION OF NITRATES + NITRITES remained stable and at low levels.

	Dodd Creek		Upper Kettle Creek		Lower Kettle Creek	
	Result	Grade	Result	Grade	Result	Grade
	Indicator and Description					
Groundwater Quality	<b>Nitrates and Nitrites</b> are forms of nitrogen that can enter groundwater from land use activities. Sources include: sewage effluent, industrial wastewaters, faulty septic systems, landfill effluent, and industrial and agricultural runoff. High concentrations of nitrates and nitrites in groundwater can make it unsafe for human consumption.					
	0.025 mg/L	A	0.025 mg/L	A	0.050 mg/L	A
	↔					
<b>Chloride</b> (salt) found in high concentrations in the groundwater can be an indication of human impact on the aquifer. Road salt, water softeners and fertilizers can be significant sources of chloride entering the groundwater.						
48.0 mg/L	A	8.1 mg/L	A	16.7 mg/L	A	
↔						
<b>Overall Grade</b>						
A		A		A		
↔						

**% Forest Cover in Dodd Creek has INCREASED 3.2%** over 2008 results

**% Forest Cover in Upper Kettle Creek has INCREASED 0.8%** over 2008 results

**% Forest Cover in Lower Kettle Creek has INCREASED 1.7%** over 2008 results

Indicator and Description	Dodd Creek		Upper Kettle Creek		Lower Kettle Creek	
	Result	Grade	Result	Grade	Result	Grade
<b>Percent Forest Cover</b> is the percentage of the watershed that is forested. Environment Canada recommends 30% forest cover in a watershed to support wildlife species.	11.2%	D	12.6%	D	19.6%	C
<b>Percent Forest Interior</b> is the protected core area found inside a woodlot that some bird species need for breeding. Ideally, a watershed should contain at least 10% forest interior habitat.	0.70%	F	1.10%	F	1.70%	F
<b>Percent Riparian Zone Forested</b> is a measure of forest cover within a 30m riparian buffer zone adjacent to all open watercourses. The riparian (or buffer zone) is a swath of land, 30m wide, adjacent to an open watercourse on both sides. Environment Canada recommends that at least 75% of the riparian zone be forested.	22.3%	D new indicator	26.0%	D new indicator	48.5%	B new indicator
<b>Overall Grade</b>	D ↑		D ↑		C ↑	

# WETLAND CONDITIONS

Wetlands play an important role in the ecological health of a watershed. Wetland health is measured by calculating the percentage of the watershed that is in wetland cover. The Kettle Creek watershed has less than 1% wetland cover, which is much less than the recommended 10% by Environment Canada. This results in an F grade for the entire watershed.

In this Watershed Report Card wetlands were assessed as a stand-alone measure, and as such are not part of the overall watershed grade. Rather the

grade is meant to highlight the need for additional wetland cover in the watershed. From the removal of hedgerows and the claiming of marginal lands to make larger fields, to extensive tiling and drainage practices historically, agriculture and development in general have had a devastating impact on wetlands in the Kettle Creek watershed.

KCCA staff are working with local landowners and municipalities to try to increase the number of wetlands through stewardship activities. These activities range from protecting and re-establishing wetlands to creating new wetlands. Some landowners are maintaining and enhancing the amount of wetland cover in the Kettle Creek

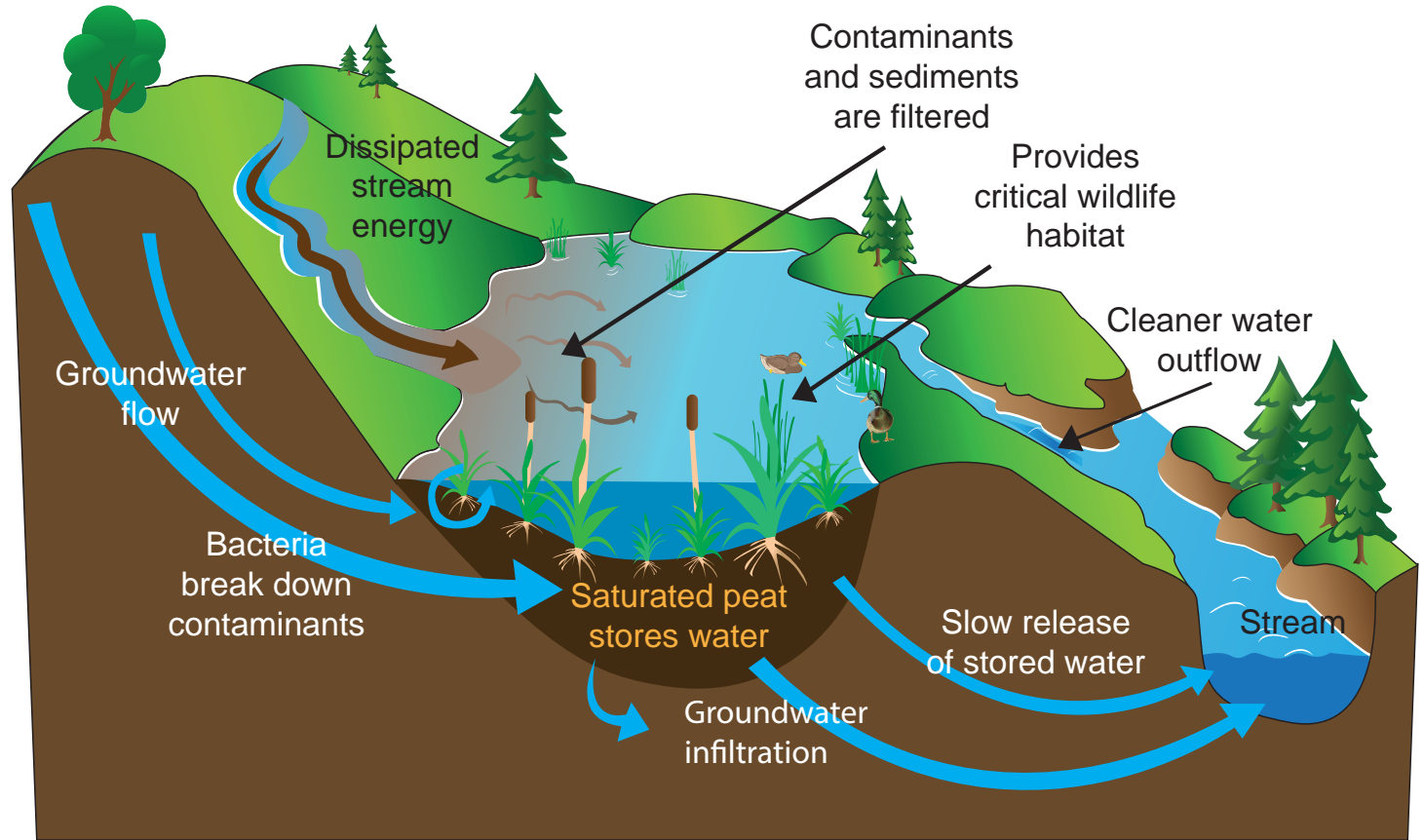
watershed by allowing poorly drained marginal lands that were previously farmed to revert to wetland cover and leaving existing wetlands untouched.

**WETLAND GOAL:**  
Source funding to offer incentives to local landowners who agree to undertake stewardship activities that enhance or restore existing wetlands on their property or who support new wetland creation projects on their property.

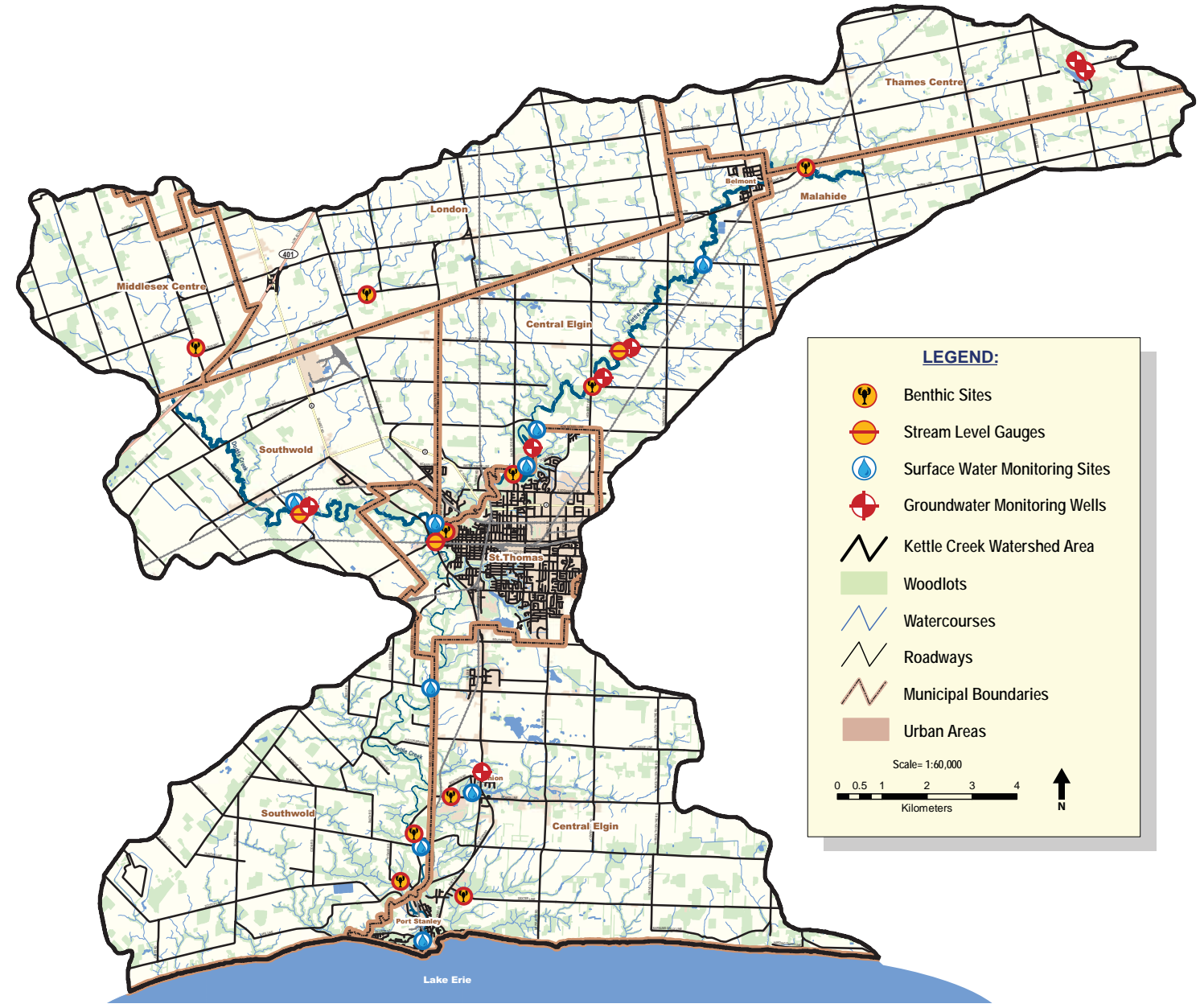


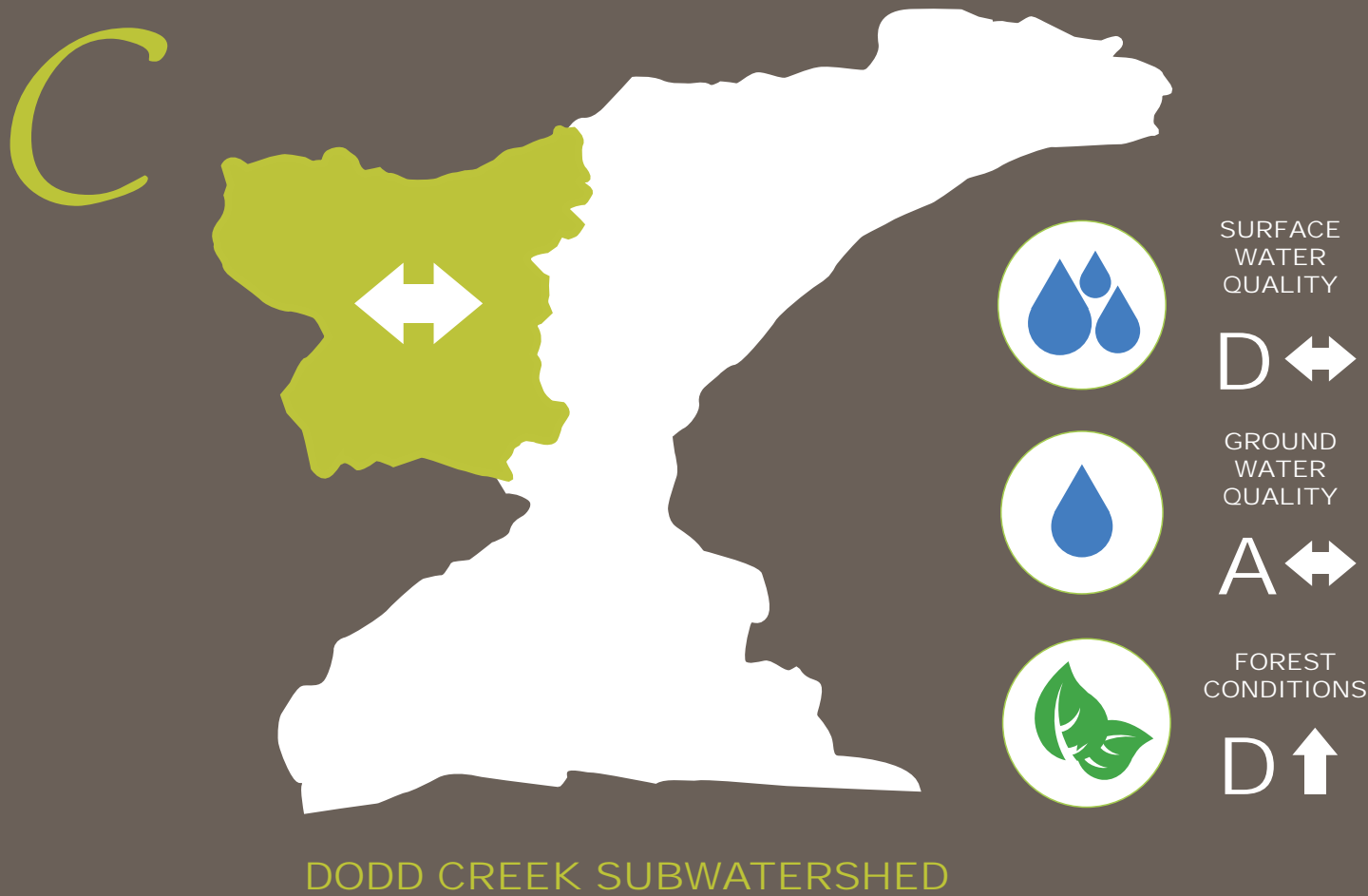
WETLAND CONDITIONS

F



# WATERSHED MONITORING SITES





0.1% Wetland Cover

**SPECIES AT RISK:**  
**ACADIAN FLYCATCHER**

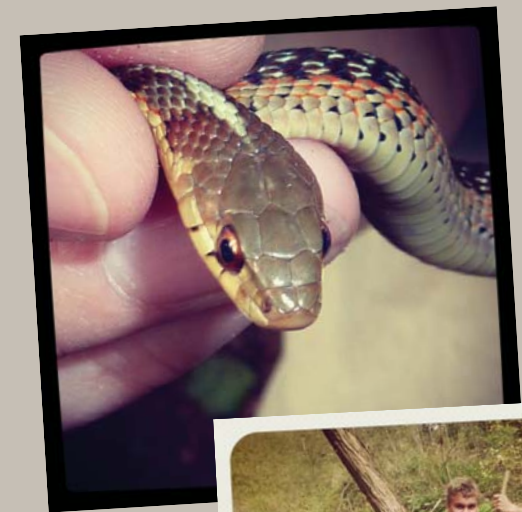
**Natural Area:**  
**Locally Significant Wetland**  
**Allan White Wetland (9.7ha)**

30 species of fish

## DODD CREEK SUBWATERSHED

Dodd Creek is the largest tributary to the main branch of Kettle Creek. As such, it is a highly important natural feature located in an extensively agricultural subwatershed. As a result, this relatively flat clay plain has very few natural areas and even fewer wetlands. Approximately 80% of the stream reaches in the subwatershed have been significantly altered, with many being straightened and channelized for drainage purposes. There is also the added negative impact of a highly disturbed riparian zone, where in some cases field crops extend right to the water's edge. These characteristics lead to poor infiltration, which can cause flashy runoff events, low base flows and warm surface water temperatures.

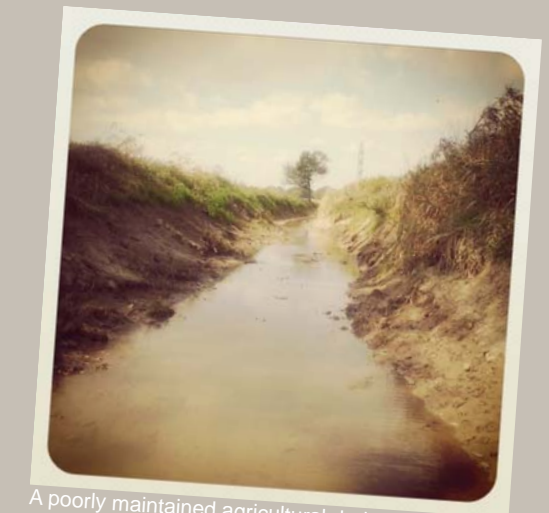
Priority stewardship activities in the Dodd Creek subwatershed must focus on erosion prevention, wetland and riparian restoration and drain maintenance.



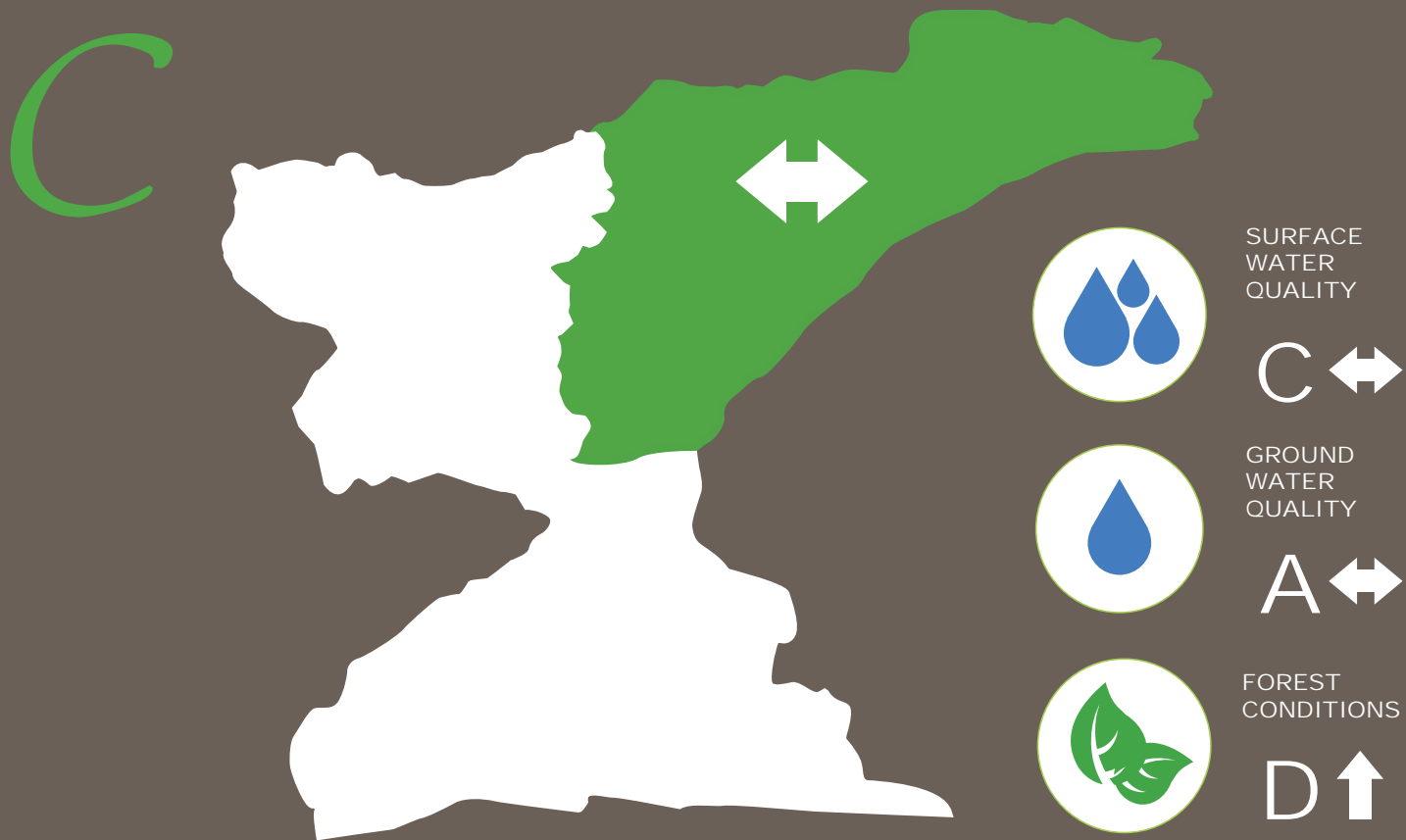
Gartersnake



Benthic Sampling



A poorly maintained agricultural drain.



UPPER KETTLE CREEK SUBWATERSHED

**0.8%** Wetland Cover

**SPECIES AT RISK:**  
**MILK SNAKE**

**Natural Area:**  
**Provincially Significant Wetland**  
**Pitcher Plant Bog (106ha)**

**26 species of fish**

UPPER KETTLE CREEK SUBWATERSHED

The headwaters of the Kettle Creek watershed originate at Lake Whittaker, an 11-hectare groundwater-fed kettle lake which is the jewel of Lake Whittaker Conservation Area. Historically, this lake suffers from poor water quality stemming from low levels of dissolved oxygen and high levels of phosphorus in the water column and trapped in the sediment. Phosphorus is a nutrient that can cause algae blooms and fish kills. The subwatershed is characterized by high surface runoff due to agricultural drainage and low infiltration due to predominantly clay and till soils.

Environmental issues and restoration needs for the subwatershed include: erosion prevention, invasive species control, protection and creation of wetlands, source water protection and reforestation.



Blue-spotted Salamander



Electrofishing



Phragmites is a highly invasive aquatic plant that is having a negative impact on our remaining wetlands.



C



SURFACE WATER QUALITY

D ↔



GROUND WATER QUALITY

A ↔



FOREST CONDITIONS

C ↑

### LOWER KETTLE CREEK SUBWATERSHED



1%

Wetland Cover

**SPECIES AT RISK:**  
**SILVER CHUB**

Area of Natural and Scientific Interest (ANSI):

**Hawk Cliff (142ha)**



29 species of fish

### LOWER KETTLE CREEK SUBWATERSHED

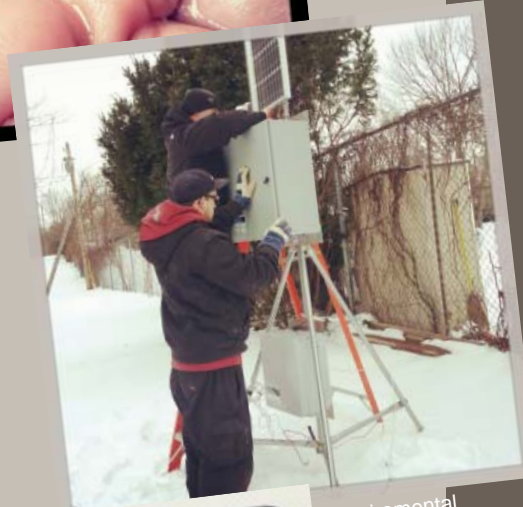
The Lower Kettle Creek subwatershed is characterized by predominantly sandy soils resulting in higher groundwater recharge capabilities than the other subwatersheds. The Lower Kettle Creek subwatershed also has the highest amount of forest cover and the lowest number of municipal drains.

One of the biggest concerns in the lower part of the watershed is the effect of Kettle Creek's water quality on the nearshore of Lake Erie, which is a major source of drinking water.

Similar to the Upper Kettle Creek subwatershed, the top environmental priorities for the subwatershed are erosion prevention, protection and creation of wetlands, source water protection and reforestation.



Rainbow Trout



Environmental Monitoring Station



Poor water quality in Kettle Creek can have a negative impact on the nearshore of Lake Erie.

# OUR CONSERVATION STORY OVER THE PAST FIVE YEARS

A Drinking Water Source Protection Plan for the Kettle Creek watershed was completed in 2012, protecting the sources of municipal drinking water in the watershed – the Wellhead Protection Area in Belmont and the Elgin Area Primary Water Supply Intake in Port Stanley.



KCCA hosts the St. Thomas-Elgin Children's Water Festival in 2008 and 2011 educating over 6,000 students in grades 3 – 5 on the importance of preserving and enhancing water quality and quantity.



To increase public awareness of where our drinking water comes from and how to protect our water sources KCCA launched a source water protection outreach and awareness campaign that included materials targeted at boaters and a Spills Workshop for local business owners and municipal staff on how to properly respond to a spill.



KCCA completed an eleven year commitment to plant 100,000 trees per year by planting its one millionth tree on June 22, 2013. Since 2001, KCCA has reforested 900 acres or 364 hectares of land in partnership with hundreds of landowners and planted at least 25 different native tree and shrub varieties every year.



KCCA completed the Lower Kettle Creek Community Based Subwatershed Strategy - the last in a series of three subwatershed reports that strives to build a partnership of community stakeholders to identify local environmental concerns and develop action plans to address these issues.



The Greening Central Elgin program was initiated which provides landowners with smaller properties in Central Elgin the opportunity to plant smaller quantities of native trees.

KCCA improves its environmental monitoring network by installing a new tipping bucket rain gauge in Belmont to increase the amount of precipitation data being collected within the KCCA watershed; a new monitoring station is added on the main branch of Kettle Creek, just upstream of where Kettle Creek outlets into Lake Erie to monitor water quality and quantity and sediment and nutrient loading into Lake Erie.



KCCA staff raised over \$500,000 to support stewardship initiatives in the watershed and Elgin and Middlesex Counties. The majority of funding was directed to landowners to implement over 60 BMP projects including erosion control, wetland creation, well decommissioning, and clean water diversion.



KCCA participated in the Trees Ontario 50 Million Trees Program, planting over 66,000 trees.

KCCA coordinates the annual Carolinian Forest Festival in partnership with Jaffa Environmental Education Centre and Catfish Creek Conservation Authority teaching over 7,000 students over five years the importance of forest ecosystems, species at risk, forest resources and climate change.



Staff conducted a community based social marketing campaign in St. Thomas aimed at reducing the amount of phosphorus entering local waterways from lawn care products.



In cooperation with Trees Ontario and other local planting agencies, KCCA hosted a free landowner tree planting workshop.

KCCA enhances its outdoor education with programs such as Wetland Explorers and participating in local festivals and shows such as the 2010 International Plowing Match, and the Western Fair.



## WHAT CAN YOU DO?

Here are some ways that you can enhance your property, protect your health, and protect the health of our watershed:

- Protect water quality by minimizing the use of fertilizer on lawns and gardens. This helps minimize nuisance aquatic plant growth that results from nutrient-rich storm water runoff.
- Make sure your well and/or septic system is properly maintained. Remember to have your well water tested at least once a year. Have your septic system pumped regularly.
- Set aside areas for reforestation. Forests filter water, prevent erosion, and play a role in recharging aquifers.
- Leave a three metre, or wider, buffer of natural vegetation along stream banks to filter runoff, provide wildlife habitat and improve and protect aquatic ecosystems. Adding native plants that have deep roots can help prevent erosion and add wildlife diversity.
- Do not store gasoline, cleaning products or chemicals near wells. Your drinking water is a precious resource - protect it.
- Make sure wells are properly capped and that abandoned wells are sealed properly. Stewardship grants are available to help with these projects. Contact KCCA staff for more information.
- Farmers should implement proper manure storage, avoid spreading in winter and avoid spreading near watercourses. Fence livestock away from watercourses.
- Plant native species in your gardens - they will be hardier, require less water and fertilizer and may attract native butterflies and feed local wildlife.