

# Brown Creek

## **SUBWATERSHED**

Report Card 2018



The St. Clair Region Conservation Authority has prepared this series of 14 subwatershed report cards as a summary of the state of the forests, wetlands, and water resources in the St. Clair Region.





# BROWN CREEK SURFACE WATER QUALITY

# D GRADE

## Surface Water Quality

Using a provincial grading system, the three surface water quality indicators score two C grades and one F grade, producing an overall grade of D for the Brown Creek subwatershed. Total phosphorus (TP) levels are the second highest in the St. Clair Region at eight times the provincial guideline. Maintaining TP levels below the Interim Provincial Water Quality Objective is intended to control excessive plant growth in rivers and streams and to protect aquatic life. *Escherichia coli* (*E. coli*) levels are slightly below average for the St. Clair Region though still nearly twice the provincial guideline for safe recreational use of water, indicating ongoing fecal contamination. The stream health grade measured by sampling benthic invertebrate communities is better than the average for the St. Clair Region but still suggests that fairly substantial organic pollution is likely.

## Local Actions to Improve Water Quality

- Develop an Environmental Farm Plan and implement agricultural Best Management Practices;
- Plant and maintain vegetated streamside buffers on one side of municipal drains and along both sides of other watercourses to stabilize the banks, shade the water, and capture nutrients;
- Fix faulty septic systems and establish a septic maintenance plan;
- Create or restore wetlands to trap nutrients, mitigate flooding, and improve habitat;
- Properly store chemicals and dispose of them through household hazardous waste days or drop-off locations (never dump down household or storm drains).

INDICATOR	BROWN CREEK			ST. CLAIR REGION AVERAGE	PROVINCIAL GUIDELINE	INDICATOR DESCRIPTION
	2001- 2005	2006- 2010	2011- 2015	2011- 2015		
Total Phosphorus (mg/L)	0.09 D	0.14 D	0.24 F	0.15 D	0.03 B	Phosphorus is found in products such as detergents, fertilizers, and pesticides. Phosphorus contributes to excess algae growth and low oxygen levels in streams and lakes.
Bacteria (CFU <i>E. coli</i> /100ml)	No data	No data	192 C	211 C	100 B (recreational use)	<i>Escherichia coli</i> ( <i>E. coli</i> ) bacteria is found in human and animal (e.g., livestock, wildlife) waste. Its presence in water indicates fecal contamination and is a strong indicator that other disease-causing pathogens are present in the watercourse.
Benthic Score (FBI)	5.65 C	5.41 C	5.44 C	5.73 C	<5.00 B (unofficial)	Benthic invertebrates are small animals without backbones that live in stream sediments. The pollution tolerances of taxa present in benthic samples are used to calculate the Family Biotic Index (FBI). The FBI ranges from 0 (excellent water quality) to 10 (very poor water quality).
<b>Overall Grade</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>D</b>		



# BROWN CREEK FOREST CONDITIONS

# D GRADE

## Forest Conditions

For the Brown Creek subwatershed, the three forest conditions indicators score a C, D and F grade, producing an overall grade of D. The percent forest cover (12.5%) is above the average for the St. Clair Region but is still less than half the recommended cover needed to support natural species diversity and water quality. The percent forest interior (2.2%) is slightly above the average for the St. Clair Region but still considered very poor as it is less than one-quarter of the recommended value. This indicates that most woodlots are too narrow to support area-sensitive species, such as Scarlet Tanager and Ovenbird. The Environment Canada guideline for southern Ontario is 10% forest interior. The percentage of the riparian zone that is forested (28.7%) is above the average for the St. Clair Region, though lower than the target of 50%.

Any changes in forest cover, either from forest loss or reforestation efforts, is visible using aerial photography. Although there have been a significant number of recent tree planting projects in this subwatershed, forests grow slowly, and young trees are not considered to be forests until they are at least 3 m tall and are developing a canopy.

## Local Actions to Improve Forest Conditions

- Establish and enlarge woodlots using a variety of native species to reduce the impact of aggressive insects and extreme weather events on tree health;
- Woodlot owners should prepare and follow Woodlot Management Plans;
- Connect woodlots by planting shelterbelts, windbreaks, and buffers along fields and watercourses to enhance wildlife habitat, protect against soil erosion, and improve water quality.

INDICATOR	BROWN CREEK			ST. CLAIR REGION AVERAGE	PROVINCIAL GUIDELINE	INDICATOR DESCRIPTION
	2001-2005	2006-2010	2011-2015	2011-2015		
Percent Forest Cover (%)	12.2 D	12.6 D	12.5 D	12.0 D	30.0 B	Percent forest cover is the percentage of the watershed that is forested. Forests are necessary to produce oxygen, store carbon, and offer many ecological services that are essential to the well-being of both humans and wildlife.
Percent Forest Interior (%)	1.9 F	2.2 F	2.2 F	2.1 F	10.0 B	Percentage of the watershed that is forest interior. Forest interior is the core area inside a woodlot that is more than 100 m from the edge. The outer 100 m is 'edge' habitat and is prone to high predation, sun/wind damage, and alien species invasion.
Percent Forested Riparian Buffer (%)	No data	25.4 D	28.7 C	23.1 D	50.0 B	Percent forested riparian buffer is the percentage of forest cover within a 30 m zone along both sides of all open watercourses. Natural cover in this zone prevents sediment and nutrients from entering the water.
<b>Overall Grade</b>	<b>D</b>	<b>D</b>	<b>D</b>	<b>D</b>		



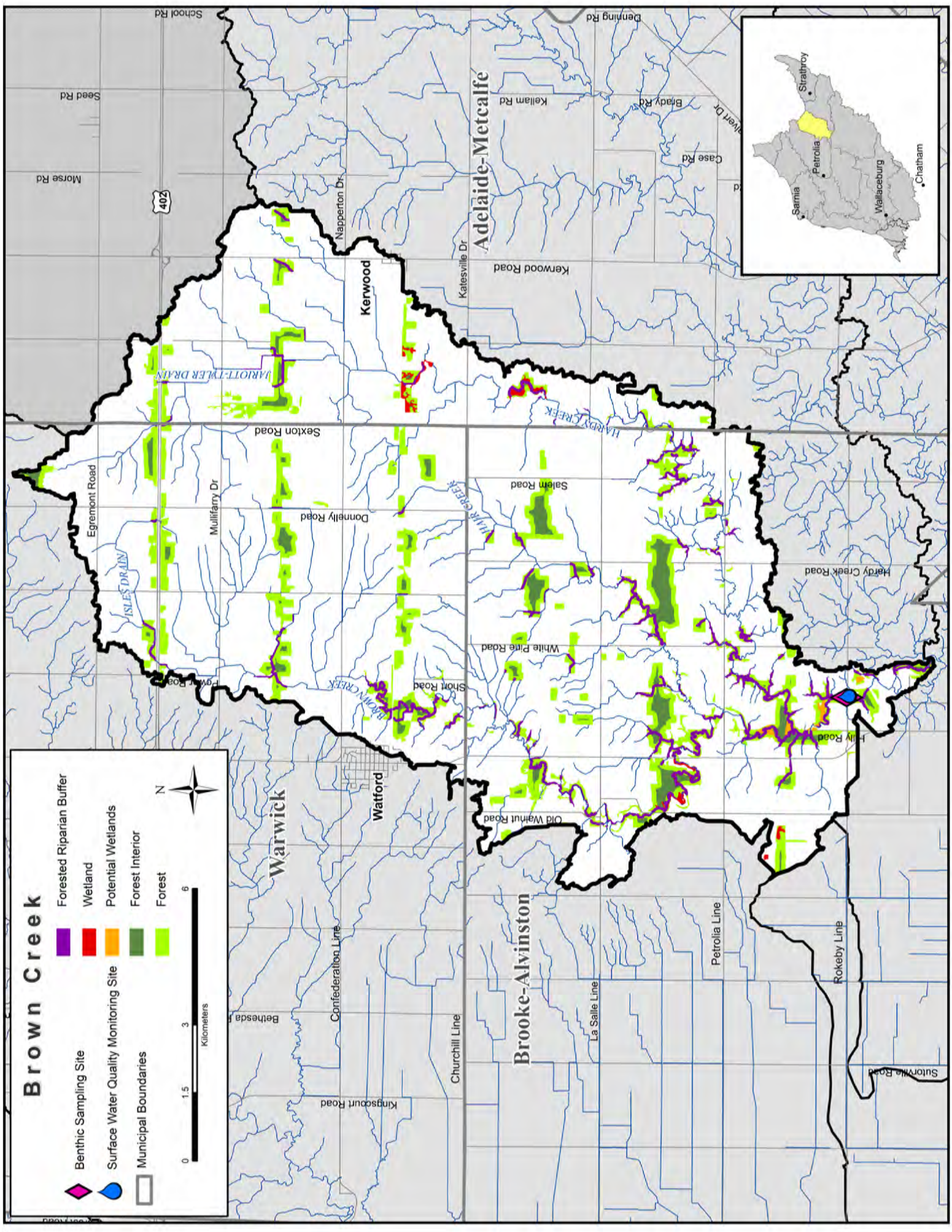
# BROWN CREEK WATERSHED FEATURES

Area	155 km <sup>2</sup> , 3.8% of the St. Clair Region watershed
Municipalities	Brooke-Alvinston (69 km <sup>2</sup> , 44%), Warwick (54 km <sup>2</sup> , 35%), Adelaide Metcalfe (33 km <sup>2</sup> , 21%)
Physiography	50% clay plains; 23% till moraines; 23% till plains (undrumlinized); 3% bevelled till plains; 1% beaches and shorecliffs
Soil Type	64% silt and clay; 25% silt and clay loams; 5% bottom land and beach; 4% loam; 2% sand loams; <1% not mapped
Streamflow	There is no flow monitoring in Brown Creek
Precipitation	The average annual precipitation at Strathroy from 2002 to 2015 was 912 mm. From 2011 to 2015, the annual precipitation varied widely around this value ranging from 663 to 1,165 mm. The previous period, 2006 to 2010, was wetter ranging from 804 to 1,241 mm.
Air Temperature	The average annual temperature at Strathroy from 2002 to 2015 was 8.5°C. From 2011 to 2015, average annual temperatures ranged more widely (6.6 to 10.0°C) than during the previous period, 2006 to 2010, which experienced more stable temperatures ranging of 8.1 to 9.4°C.
Tile Drainage	31% not tiled; 21% randomly tiled; 48% systematically tiled
Watercourse Length and Type	Total length: 209 km Watercourse type: 23% natural, 42% municipal drain, 34% unclassified
Dams and Barriers	Four dams, all privately owned
Sewage Treatment	Kerwood Wastewater System (KWWS) was established in 2011 to replace inadequate and/or malfunctioning private septic systems in the community of Kerwood. A collection sewer system and a series of subsurface treatment beds were constructed. KWWS discharges treated effluent into the Kerwood Municipal Drain that discharges into Hardy Creek, then Brown Creek and ultimately into the East Sydenham River just upstream of Alvinston.











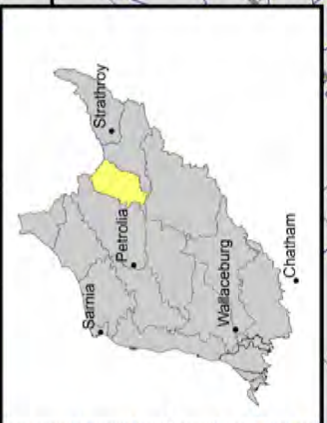
# BROWN CREEK WATERSHED FEATURES

<p>Fisheries Resources</p>	<p>Twenty-seven fish species; game fish include Northern Pike. No freshwater mussel species recorded due to a lack of sampling effort.</p>					
<p>Species at Risk</p>	<p>Birds: Acadian Flycatcher, Bank Swallow, Barn Swallow, Bobolink, Chimney Swift, Eastern Meadowlark, Least Bittern, Prothonotary Warbler, Yellow-breasted Chat Mammals: Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis Molloscs: Eastern Pondmussel, Northern Riffleshell, Rayed Bean, Round Pigtoe, Salamander Mussel, Snuffbox, Wavy-rayed Lampmussel Plants: American Chestnut, American Ginseng, Blue Ash, Butternut, Eastern Flowering Dogwood, Goldenseal, Green Dragon, Kentucky Coffee-tree Reptiles: Blanding's Turtle, Eastern Hog-nosed Snake, Northern Map Turtle, Queensnake, Spiny Softshell</p>					
<p>Groundwater</p>	<p>The shallow unconfined aquifers associated with the Seaforth Moraine provide groundwater to some residents. The deeper aquifer at the interface between the overburden and the bedrock, known in Lambton as the Fresh Water Aquifer, provides some groundwater but is limited in quantity and has elevated chloride. Therefore, municipally-piped water from an intake on Lake Huron is available in most of this region.</p>					
<p>Wetland Cover</p>	<p>48 ha or 0.3% of the subwatershed is identified as wetlands by the Ministry of Natural Resources and Forestry. An additional 20 ha (0.1% of the subwatershed) are identified by the St. Clair Region Conservation Authority (SCRCA) as potential wetlands. Wetlands are vital to the landscape as they reduce flooding and filter water. Environment Canada recommends a minimum of 6% wetland cover at a subwatershed scale.</p>					
<p>Woodlot Size</p>	<p>Size Category</p>	<p>Number of Woodlots</p>	<p>% of Woodlots</p>	<p>Total Woodland Area (ha)</p>	<p>% of Total Woodland Area</p>	<p>Largest Woodlot (ha)</p>
	<p>&lt;5 ha</p>	<p>87</p>	<p>58</p>	<p>165</p>	<p>8</p>	
	<p>5-10 ha</p>	<p>22</p>	<p>14</p>	<p>157</p>	<p>8</p>	
	<p>10-30 ha</p>	<p>22</p>	<p>14</p>	<p>409</p>	<p>21</p>	<p>156</p>
	<p>&gt;30 ha</p>	<p>18</p>	<p>12</p>	<p>1,217</p>	<p>62</p>	
	<p>Total</p>	<p>149</p>		<p>1,948</p>		



# Brown Creek

-  Benthic Sampling Site
-  Surface Water Quality Monitoring Site
-  Municipal Boundaries
-  Forested Riparian Buffer
-  Wetland
-  Potential Wetlands
-  Forest Interior
-  Forest



Warwick

Watford

Kenwood

Adelaide-Metcalf

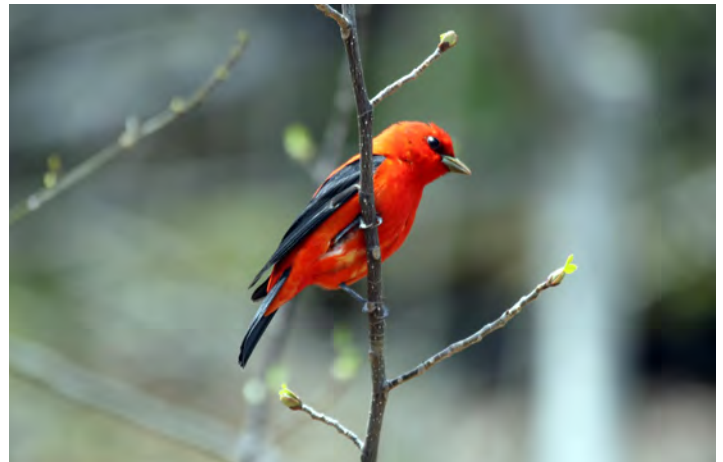
Brooke-Alvinston

Map labels include: School Rd, Seed Rd, Morse Rd, Napperton Dr, Katesville Dr, Kenwood Road, Kellam Rd, Denning Rd, Brady Rd, Case Rd, Napperton Dr, Harry Creek, Salem Road, Donnelly Road, Sexton Road, Egremont Road, Mulberry Dr, White Pine Road, Shot Road, Old Walnut Road, Kingscourt Road, Churchill Line, Bethesda, Confederation Line, La Salle Line, Petrolia Line, Rokeby Line, Sutoria Road, Hardy Creek Road, and Lily Road.

# BROWN CREEK HIGHLIGHTS

## Highlights and Progress Since 2011

- There were 22 landowner stewardship projects completed in the Brown Creek subwatershed from 2011 to 2018. These projects included the restoration of wetlands, stabilization of streambanks, creation of tall grass prairie habitat, and the planting of trees and windbreaks (left photo). More than 26,600 trees were planted and the total value of all the projects was \$245,900 (40% grants).
- Starting in 2011, the Ministry of Transportation has contracted the SCRCA to plant windbreaks along the 402 Highway to improve road safety, especially in the winter – 9,500 trees have been planted to date.



- For the Lambton Natural Heritage Study led by the County, North-South Environmental surveyed natural areas in nine municipalities from 2010 to 2012. Regionally rare birds or plants were noted at every site, highlighting the importance of maintaining and enhancing even small natural areas (right photo: Scarlet Tanager, PC: Rick Battson).
- Mary-Ellen and John King have retired a total of 49 hectares of marginal or fragile land and completed a series of stewardship projects since 2005. One of their projects involved diverting tile outlets into a series of constructed wetlands to filter runoff from the farm.
- Thames-Sydenham and Region Source Protection Plan was developed and implemented by the end of 2015. The Plan identifies potential threats to municipal drinking water sources, determines vulnerable areas, and requires the development of Risk Management Plans to address these threats.
- Ontario NativeScape has been fundraising and supporting landowners undertaking stewardship projects across Lambton County since 1994.



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