

Lower Bear Creek Watershed Report Card 2013

This report card summarizes surface water quality and forest condition in the Lower Bear Creek watershed within the St. Clair Region Conservation Authority jurisdiction from 2001 to 2010. The summary is intended to provide citizens, community groups, municipalities, industries and agencies with information so they can take actions to protect or enhance the environmental features of the watershed. The ongoing monitoring will be reported on a five-year cycle which will help local people manage their local environment. This card uses the 2011 guidelines and updated grading system for Conservation Authority Watershed Report Cards. These new province-wide standards have a more stringent grading system and result in generally lower grades in the intensely developed regions of southwestern Ontario.

This report card is part of a larger report entitled the St. Clair Region Conservation Authority Watershed Report Card (2013) available at www.scrca.on.ca. Further information including methodology, comparisons with the other 13 St. Clair Region watersheds, regional maps and summary tables are also found in that document.

SURFACE WATER QUALITY

Steady

D

Indicator	Lower Bear Creek		St. Clair Region 2010	Provincial Guideline	Indicator Description
	2005	2010			
Total Phosphorus (mg/L)	0.23	0.19 F Improving	0.13 D	0.03	<i>Phosphorus is found in products such as detergents, fertilizer and pesticides, and contributes to excess algae and low oxygen in streams and lakes.</i>
Bacteria (#E. coli/100mL)	216	215 C Steady	169 C	100 (recreational use)	<i>Fecal bacteria are found in human and animal (livestock/wildlife) waste. Their presence in water indicates fecal contamination and is a strong indicator that other disease-causing organisms are in the watercourse.</i>
Benthic Score (FBI)	5.5	5.8 D Declining	5.9 D	None	<i>Benthic invertebrates are small animals without backbones that live in stream sediments. The Family Biotic Index (FBI) scores each taxa according to its pollution tolerance and ranges from 1 (healthy) to 10 (severely degraded).</i>

FOREST CONDITION

D

Indicators	Lower Bear Creek		St. Clair Region 2010	Indicator Description
	2005	2010		
Forest Cover %	14.7	14.5 D	11.4 D	<i>Forest Cover is the percentage of a watershed that is forested. Environment Canada recommends that 30% of a watershed should be forest and other natural cover to sustain native plants and animals.</i>
Forest Interior %	2.4	2.7 D	2.0 F	<i>Forest Interior is the core area inside a woodlot that some bird species need to breed successfully. The outer 100 m perimeter of a woodlot is prone to high predation, sun and wind damage, and alien species invasion.</i>
Forested Riparian Buffer %	No data	30.4 C	21.2 D	<i>Forested Riparian Buffer is the 30 m area that is forested on both sides of an open watercourse. Natural cover in this area aids in sediment and nutrient removal.</i>

The changes in forest condition percentages between the two time periods may reflect more accurate mapping, rather than an actual gain or loss of forest cover.

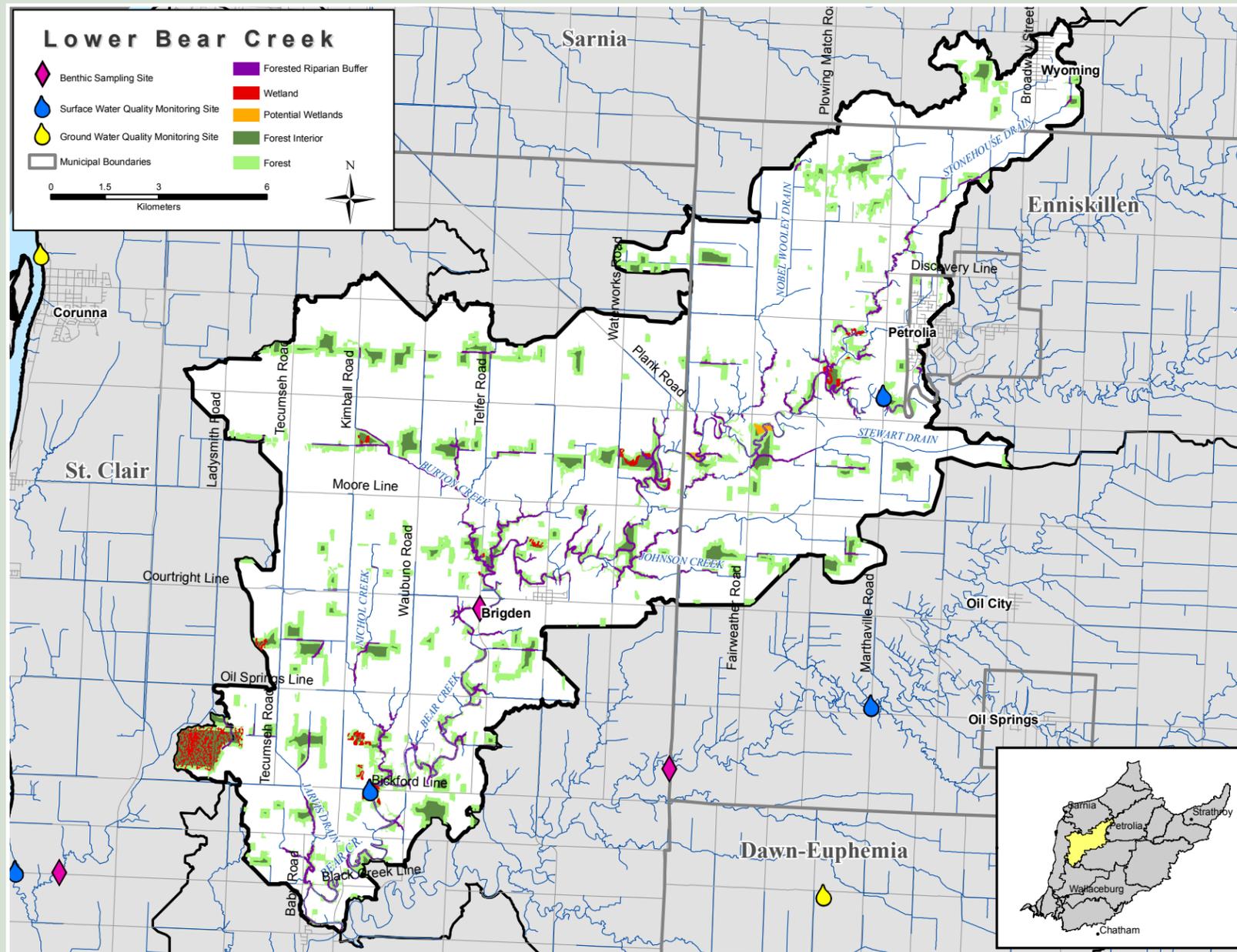
Forest Condition

The three forest condition indicators score a D, D and C, producing an overall grade of D. This watershed has low forest cover, riparian cover and forest interior. The majority of the woodlands are less than 5 hectares in size. The percent forest cover (14.5%) is higher than the St. Clair Region average but is too low for sustainability. The target for southern Ontario is 30% forest cover. The percent forest interior (2.7%) is slightly higher than the regional average but too low to support area sensitive species such as Scarlet Tanager and Ovenbird. The target for southern Ontario is 10% forest interior. The percentage of the riparian zone that is forested (30.4%) is higher than average in the region, though lower than the target of 50%.

Although there have been a significant number of tree-planting projects in this watershed, forests grow very slowly, and recent reforestation efforts are not likely to be visible in aerial photography. Young trees are not considered to be forests until the trees are at least 3 m tall and a canopy is developing. Forest loss from land use changes will be visible from above.

Local Solutions to Improve Forest Condition

- Increase forest interior by “bulking up” woodlots with a variety of native species to make the woodlots larger and rounder, to reduce the impact of extreme weather events on tree health
- Woodlot owners should prepare and follow Woodlot Management Plans
- Connect the woodlots by planting shelterbelts, windbreaks and buffers along fields and watercourses, which will also protect against soil erosion and improve water quality



Highlights Since 2005

- Private landowners have completed 38 stewardship projects including wetland enhancement and extensive tree and shrub plantings
- Marthaville Habitat Management Area received recognition as a diverse natural area, with woodlands, wetlands, meadow and prairie habitats that are accessible from public trails
- Meadowview Villa in Petrolia naturalized over two hectares of property, with native trees and shrubs

Surface Water Quality

The surface water quality indicators score F, C and D producing an overall grade of D (using the provincial grading system).

Levels of phosphorus remain extremely elevated at more than six times the Ministry of the Environment (MOE) guideline. They have improved slightly since 2005 when they were almost eight times the MOE guideline.

Fecal bacteria have remained consistent since 2005, and continue to indicate ongoing contamination from human and animal waste.

Water quality based on benthic scores ranks a D and has deteriorated since 2005.

Local Solutions to Improve Water Quality

- Implement Environmental Farm Plans, particularly for fertilizer and nutrient management, to reduce nutrient loss
- Fix faulty septic systems and ensure proper maintenance
- Develop and maintain streamside buffers along one side of all watercourses, especially municipal drains, to stabilize the banks

Impacts of Climate Change

- We can expect more severe weather: more storms with intense rainfall or snow; and more extended droughts.
- We can expect flooding conditions more often throughout the summer.
- Warmer temperatures will result in shifts in species diversity and will put pressure on species at risk.
- Less predictable weather increases the need to carry out stewardship projects and improved stormwater management to help protect watersheds.

Lower Bear Creek

Watershed Features

Area	253 km ² , 6.1% of the St. Clair Region watershed					
Municipalities	St. Clair (159 km ²), Enniskillen (81 km ²), Plympton-Wyoming (10 km ²), Petrolia (3 km ²)					
First Nations	None					
Physiography	94% bevelled till plain; 6% till moraine					
Soil Type	95% silt and clay; 4% bottom land and beach; 1% silt and clay loam; 1% sand loam					
Streamflow	The mean annual flow is 2.91 cubic metres per second (cms) measured in Bear Creek just above Petrolia. From 2006-2010, annual flows varied widely, ranging from 1.89 to 5.30 cms. The previous period, from 2003-2005, flows were closer to the mean, with 2.25, 2.03 and 2.97 cms. Farther down the watershed at Brigden the mean annual flow is 5.90 cms. From 2006-2010, annual flows varied widely from this mean, ranging from 3.82 to 9.91 cms. From 2003-2005, flows at Brigden were closer to the mean, at 3.80, 4.31 and 6.78 cms.					
Precipitation	The average annual precipitation at Petrolia from 2002-2010 was 922 mm. From 2006-2010, levels were usually above this value, but ranged from 760 to 1131 mm. The previous period, from 2002-2005, was always lower than the mean, ranging from 773 to 942 mm.					
Air Temperature	The average annual temperature at Petrolia is 8.9°C. From 2006 to 2010, average annual temperatures were close to the normal, ranging from 8.0 to 9.8°C. The previous period of record, 2002-2005, was similar with a range of 8.3 to 9.8°C.					
Tileage	31% randomly tiled; 38% systematically tiled; 31% unknown drainage					
Watercourse Length & Type	Total length: 333 km Watercourse type: 31% natural; 50% open municipal drain; 2% buried; 17% unclassified					
Dams and Barriers	7 dams including 4 public dams: 3 at L.C. Henderson C.A. and one at Marthaville Habitat Management Area					
Sewage Treatment Plants	The Wyoming Wastewater Treatment Plant discharges treated effluent to Stonehouse Drain which enters Bear Creek below Petrolia, in the upper portion of this watershed. The Brigden sewage treatment lagoons discharge treated effluent to Bear Creek downstream of Courtright Line.					
Fisheries Resources	14 fish species and 8 freshwater mussel species have been recorded. Game fish include Largemouth Bass and Yellow Perch.					
Species at Risk	Plants: Blue Ash, Green Dragon, Kentucky Coffee-tree Birds: Bobolink Reptiles: Eastern Spiny Softshell Turtle Fish: Blackstripe Topminnow, Spotted Sucker Mussels: Mapleleaf					
Stewardship Projects	38 stewardship projects have been completed in this watershed from 2006 to 2010, including the planting of 23,730 trees and shrubs. Memorial Forest and Conservation Area tree plantings from 1988 to 2012 include one additional project (10,736 trees and shrubs)					
Groundwater	The only aquifer is at the interface between the overburden and the bedrock, and is known as the Fresh Water Aquifer. It has high sodium and chloride and is of limited quantity. Most of the residents are supplied by municipal piped water from Lake Huron intakes.					
Wetland Cover	127 ha (0.5 % of the watershed) are identified as wetlands by MNR. An additional 12 ha (0.05% of the watershed) are identified by SCRCA as potential wetlands.					
Woodlot Size	Size Category	Number of Woodlots	% of Woodlots	Total Woodland Area (ha)	% of Total Woodland Area	Largest Woodlot (ha)
	<5 ha	161	58	316	9	171
	5-10 ha	37	11	266	7	
	10-30 ha	43	15	763	21	
	>30 ha	38	14	2,313	63	
	Total	279		3,658		



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