

St. Clair Region Conservation Authority
Watershed Report Card

 2008



Foreword

The St. Clair Region receives a C grade for Surface Water Quality and a D grade for Forest Conditions, using Watershed Report Card standards developed by Conservation Ontario and the Ministry of the Environment.

Although these grades are low compared with the province-wide standards, the region continues to support an extraordinary number of rare plant and animal species. In the St. Clair Region over 80 species are recognized as unusual under federal or provincial legislation. The largest watershed in the region is the Sydenham River. While this river scored poorly on water quality, it still supports more mussel species than any other river in Canada. The Sydenham supports healthy reproducing animals such as Northern Riffleshell mussels, which are struggling in other North American watersheds. The Sydenham River has been recognized as nationally significant because it is home to 34 species of freshwater mussels.

Likewise, although the region has a low score for Forest Cover, it contains many significant tree and bird species that do not thrive in most of Ontario. Ontario's largest known concentration of Blue Ash trees occurs in the St. Clair Region and to date Blue Ash trees have demonstrated resistance to Emerald Ash Borer.

Provincially-rare birds such as Cerulean Warbler, Acadian Flycatcher, Yellow-breasted Chat, Hooded Warbler and Red-headed Woodpecker breed in St. Clair Region woodlands. The existence of these birds enriches our quality of life, and also provides valuable natural control of insects.

The St. Clair Region hosts an unusual mosaic of farmland and forests, urban areas, industrialization and natural areas. This mosaic has low Report Card scores that reflect our urban, agricultural and industrial activities but the natural biological diversity is extraordinary nonetheless. Residents, agencies and municipalities must act to protect and improve this region of Canada which is "uniquely St. Clair".

Executive Summary

The Watershed Report Cards have been prepared to help watershed residents and agency staff and directors evaluate the environmental health of the region. The report provides a summary of existing monitoring programs, and evaluates key indicators based on provincial standards for watershed health.

This first set of Report Cards for 14 watersheds in the St. Clair Region Conservation Authority and associated First Nations is based on forest and surface water quality conditions from 2001 to 2005. The provincial indicators and scoring system were recommended by Conservation Ontario to provide a standard reporting system across the Conservation Authorities of Ontario. The scoring system uses grades on a five-point scale from A down to F.

Surface Water Quality grades in the St. Clair Region range from B to D, with C being the most common grade. Forest Condition ranges from C to D, with D being the most common grade. These conditions reflect

both natural features such as predominantly clay soils, and also intensive agricultural activities and some urbanization.

In addition to the grades, these Report Cards describe features of individual watersheds such as geology, soils, land use, major watercourses, natural areas, streamside buffers, wetland coverage, fish communities and Species at Risk.

The St. Clair Region has been heavily impacted by humans. By examining our area on small, ecologically relevant watershed units we can improve our monitoring programs and better identify areas to be protected and areas to be improved. Local solutions are suggested for individual and collective actions to protect or improve our environment.





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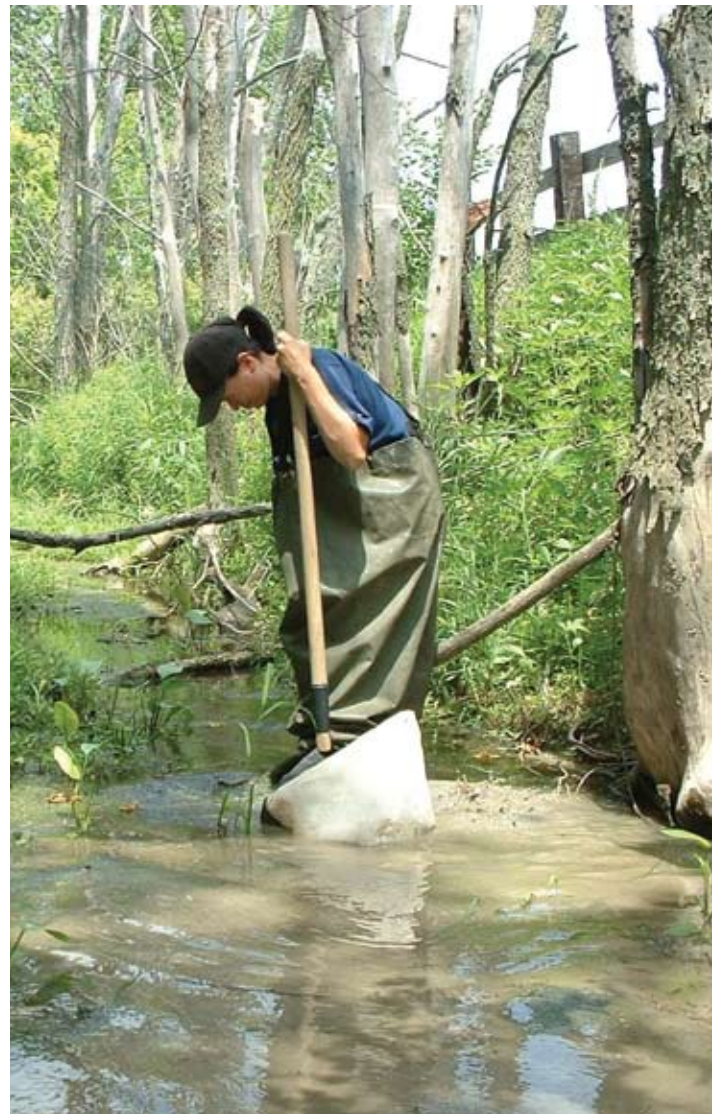
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Individual Watershed Report Cards

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Brown Creek
Middle East Sydenham
Lower East Sydenham
Bear Creek Headwaters
Lower Bear Creek
Black Creek
Lower North Sydenham
Lambton Shores Tributaries
Plympton Shoreline Tributaries
Cow and Perch Creeks
St. Clair River Tributaries
Lake St. Clair Tributaries





St. Clair Region Watershed Report Card

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1.0 Introduction

Residents of the St. Clair Region are interested in the environment in which they live, and want to know how to make their region healthy. A Watershed Report Card provides the residents and employees in the region with a description of key features of the region, and provides marks for certain measurable parameters.

The St. Clair Region is a developed portion of southern Ontario, with 167,000 residents and agricultural practices affecting the majority of the 4,131 square kilometer (1,595 square mile) area.

General indicators for watershed health include:

- Forest Conditions
- Surface Water Conditions
- Groundwater Conditions

These indicators were selected by Conservation Ontario for the first province-wide Conservation Authority Report Cards because they would provide standardized and focused reporting across many watersheds in Ontario. Report Cards present easily understood environmental information for the public and allow evaluation and communication on the state of the environment and on the progress being made in its protection.

2.0 Background

In 1961 the municipalities drained by the Sydenham River formed the Sydenham Valley Conservation Authority. In 1972 the watersheds from Hickory Creek on Lake Huron west to the beginning of the St. Clair River and south to Rankin Creek on Lake St. Clair joined the region which was renamed the St. Clair Region Conservation Authority (SCRCA). In 2005 the watersheds between the Hickory Creek and the Ausable River watersheds joined the SCRCA.

The SCRCA includes portions of Middlesex County, Lambton County, Sarnia and the Municipality of Chatham-Kent. The Sydenham River drains 2,724 square kilometers. Hickory Creek, Cow and Perch Creeks, Clay

Creek and over ten other creeks drain 1,407 square kilometers of land toward Lake Huron, the St. Clair River or Lake St. Clair. Lake Huron is north of this region, the Ausable River is northeast, the Thames River watershed is to the south and the St. Clair River and Lake St. Clair to the west.

Conservation Ontario recommended Forest Condition, Surface Water Condition and Groundwater Condition as three general indicators for assessing watershed health in a Conservation Authority. They recommended that these indicators be considered or measured over a five-year time period, and Conservation Ontario developed a grading system, from A down to F.

Useful measures of Forest Condition include the percentage of the landscape which has forest cover, and the percentage of that forest which is "interior forest". Surface Water Condition can be assessed using the Total Phosphorus and *Escherichia coli* (E. coli) bacteria values, and an index of the Benthic Invertebrates (small animals including insects and worms which live on the bottom of the watercourse). Groundwater Condition can be assessed from its E. coli, nitrate/nitrite and chloride values.

This document includes Report Cards for the area described as the St. Clair Region, which includes the current St. Clair Region Conservation Authority and the Kettle and Stony Point, Aamjiwnaang and Walpole Island First Nations (Figure 1).

The first Report Cards for the St. Clair Region cover the time period from 2001 to 2005, inclusive.



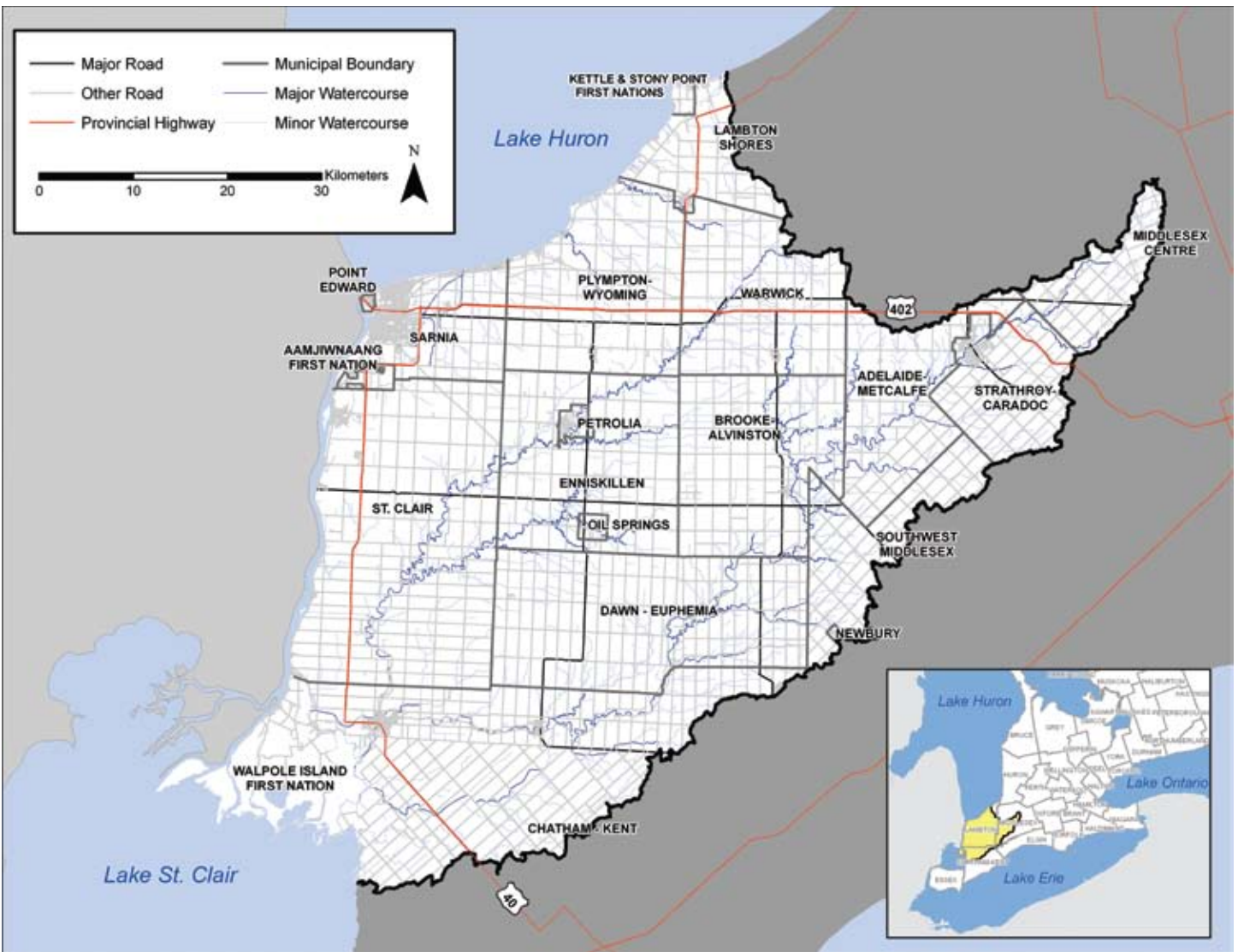


Figure 1 - Municipalities and First Nations of the St. Clair Region

2.1 Watersheds

The St. Clair Region was divided into 14 watersheds in order to have local watersheds with which citizens would identify issues and successes. This division also creates areas of a manageable size for assessing conditions and monitoring change (Figure 2).

The SCRCA had divided the area of jurisdiction into ten watersheds since 2002 for the surface water monitoring programs. The divisions are actually sub-watersheds of the Sydenham River, or sub-basins of Lake Huron, the

St. Clair River or Lake St. Clair but the divisions have been called “watersheds” for convenience.

Further development of the Report Card indicated that First Nations lands should be included when considering the broader environment in this region. Some watersheds were too large to have a local identity. Also, an additional portion of Lambton Shores joined the SCRCA in 2005. Consequently, the St. Clair Region is divided into 14 watersheds for the Watershed Report Cards.

St. Clair Region Watershed Report Card



Figure 2 - Watershed Report Card Boundaries within the St. Clair Region

The Sydenham River drainage basin is now divided into nine watersheds:

1. East Sydenham Headwaters (the portion of the former Upper East Sydenham watershed which begins at the first confluence below Strathroy);
2. Upper Sydenham River (the portion of the former Upper East Sydenham watershed which begins below the first confluence below Strathroy);
3. Brown Creek;
4. Middle East Sydenham;
5. Lower East Sydenham including the watershed of the combined East Sydenham River and North Sydenham River from Wallaceburg to the Chenal Ecarte;
6. Bear Creek Headwaters (the portion of the former Bear Creek watershed which begins at the first confluence below Petrolia);
7. Lower Bear Creek (the portion of the former Bear Creek watershed which begins below the first confluence below Petrolia);
8. Black Creek; and
9. Lower North Sydenham including the Running Creek watershed from the North Sydenham west to the Chenal Ecarte.



St. Clair Region Watershed Report Card

The Lake Huron Tributaries watershed is divided into:

10. Lambton Shores Tributaries: area drained by creeks which enter Lake Huron within Lambton Shores and Kettle and Stony Point First Nation;
11. Plympton Shoreline Tributaries: area drained by creeks which enter Lake Huron within Plympton-Wyoming;
12. Cow and Perch Creeks.

Other watersheds:

13. St. Clair River Tributaries: area drained by creeks entering St. Clair River including Aamjiwnaang First Nation;
14. Lake St. Clair Tributaries: area drained by creeks entering Lake St. Clair south of the Sydenham River watershed, and the Walpole Island First Nation.

2.2 Features

The natural features and the human land uses determine the characteristics of a region. These have recently been described in the Draft Watershed Characterization Report for Thames Sydenham and Region (SCRCA 2007). Information from this report has been used to provide the following background. The Report Card of each of the 14 watersheds includes a description of the natural features and land uses specific to that watershed. Much of the watershed features data is summarized in the Appendices.



The surface of this region was shaped by glacial deposits during the Pleistocene ice age 10,000 years ago, founded on bedrock which includes limestone, dolostone, sandstone and shale. These glacial deposits now determine the soils, contours and natural drainage patterns of the landscape. The dominant

feature of the SCRCA is the glacial lake bottom which is now the relatively flat and featureless clay plains. Sand plains from Caradoc to Bothwell in the southeastern SCRCA were deposited as river deltas and beach dunes and ridges. Till soils, which are a mixture of clay, silt, sand, and pebbles, are found in the northeastern SCRCA in the low ridges and hummocks of the Wyoming, Seaforth and Lucan Moraines. The shorelines along Lake Huron include shale bedrock outcrop at Kettle Point, bluffs to the south toward Blue Point and low sandy beaches nearer to Sarnia. The St. Clair River shoreline is largely developed but includes some beaches and narrow wetlands. Along the delta of the St. Clair River and beside Lake St. Clair the shoreline ranges from extensive marshes to earthen dykes and hardened shorelines.

The percentage of a watershed which is a particular soil type was derived using the Ontario Ministry of Agriculture and Food, Soils Ontario Map Version 1.0 which generated a seamless digital data base from soils maps delineated for each county.

The landscape has been influenced by human land uses, including clearing of the forest, agricultural land practices and urban and industrial developments. Agricultural land use categories developed by the Ontario Ministry of Agriculture, Food and Rural Affairs in the early 1980s (OMAFRA 1983) have been used to characterize land use within each Report Card.

Within the St. Clair Region there are now over 6,000 kilometers of watercourses. Over the past 125 years, drainage works have modified the natural drainage for agricultural, residential and industrial development. The majority of the first order watercourses (those originating in a seepage zone or spring) and second order watercourses (those formed by two first-order streams combining) have been dredged, straightened or enclosed in agricultural tiles. In addition, the surface waters have been affected by changes to the land beside the watercourse in the riparian or streamside zone. Natural vegetation beside a stream or drain can filter sediment and runoff of agricultural nutrients, shade and cool the water, reduce bank erosion, provide



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shoreline habitat for fish and contribute organic debris for aquatic organisms. Environment Canada recommends that 75% of the stream length should be naturally vegetated, with at least 30 meters of natural vegetation on both sides of the watercourse (Environment Canada 2004). Woodland, shrubs, meadow or pasture vegetation could provide this vegetated streamside cover.

Geographic Information System (GIS) mapping for the St. Clair Region watershed can identify woody vegetation along a watercourse. For this report the feature "Streamside Cover" illustrates the percentage of the watercourse which has treed vegetation (woodland, shrub thickets or clusters of trees) for the 15-meter area on both sides of the open watercourse. Meadow and pasture vegetation may actually occur along many watercourses, but this cannot be identified at this date because of data limitations.

Extensive wetlands were found historically in the St. Clair Region but drainage works have reduced the swamps, marshes and bogs to less than 1% of the land surface. Environment Canada recommends that more than 10% of each major watershed should be in wetland habitat and more than 6% of each sub-watershed should be in wetland habitat (Environment Canada 2004).

In 2005 Ontario Ministry of Natural Resources (OMNR) completed the Southern Ontario Land Resource Information System (SOLRIS) program which identified wetlands using interpretation of 2005 air photos. The SOLRIS mapping tool has been used to calculate the percentage of wetlands reported as a specific Wetlands feature of each watershed.

Before the SOLRIS was developed, most large wetlands in the region were evaluated between 1984 and 2000, using the OMNR Wetland Evaluation System (OMNR and CWS 1984). The wetland evaluation system was used to score sites as Locally Significant Wetlands or Provincially Significant Wetlands. These evaluated wetlands have been named and listed among the Natural Areas features of each watershed.

Natural Areas in the St. Clair Region have been identified by many agencies and groups over the past 30 years (Allen et al. 1990; Carolinian Canada 1985; Hiltz and Cook 1982; OMNR 1984a, 1984b; University of Waterloo 1979-80) and more recently in Official Plans for Lambton County, Middlesex County and the City of Sarnia. Many of these sites are also named and evaluated wetlands. Natural Areas which have recognized names are listed in the features of each watershed.

The SCRCA has a rich fish community, with at least 76 species of native fish and six introduced species. The majority of the fish communities are warm water species. The only cold or cool water communities currently in the SCRCA occur in the Sydenham Headwaters watershed. Fish species which are named in the features have been identified during electro-fishing by the SCRCA and Fisheries and Oceans Canada staff.

The St. Clair Region includes a rich diversity of plants and animals, many of which are found nowhere else in Canada. Within the St. Clair Region there are over 70 species of plants or animals which have been recognized by the federal Committee on the Status of Wildlife in Canada (COSEWIC) or the Ontario Ministry of Natural Resources as Species at Risk because they are Endangered, Threatened or of Special Concern. This includes 27 species of plants, 11 species of reptiles, 11 bird species, 9 species of mussels, 9 species of fish, and 2 mammal species. The Species at Risk within each watershed are listed using records provided by the OMNR Natural Heritage Information Centre (NHIC) and SCRCA staff and dating from 1980 to 2006.



2.3 Grades

Grades have been developed for all watersheds where there is sufficient information. Where information is only available on one or two indicators, the condition grade is based on one indicator or on the average of two indicators.

Grades have also been developed for the total St. Clair Region.

The process and methodology for this document have benefited from the input of watershed stakeholders in a Technical Advisory Committee. This committee included representatives of the Lambton, Kent and Middlesex Farm Associations and Lambton Wildlife Incorporated; planning staff from Lambton County, Middlesex County and the Municipality of Chatham-Kent; staff from the Ausable Bayfield Conservation Authority, the Ontario Ministry of Agriculture, Food and Rural Affairs and the Ontario Ministry of Natural Resources, and a Director of the St. Clair Region Conservation Authority.

The grades and description of features for each watershed were reviewed by an SCRCA Staff Technical Committee which developed lists of potential actions which would improve the watershed health. The watershed Technical Advisory Committee also suggested local actions and activities which will improve the health of the watersheds.



The development of this document was strongly influenced by the Conservation Ontario Watershed Report document (Conservation Ontario 2003), the Upper Thames River Conservation Authority Watershed Report Card (UTRCA 2001) and the Ausable Bayfield Conservation Authority Watershed Report Card (Veliz et al. 2006).

3.0 Calculating Indicators

3.1 Forest Condition Calculation and Grading

The condition of a forest is determined by many factors, including the size and shape of the forest, the type and abundance of species, abundance of exotic species, presence of pathogens and the degree of disturbance. Many of these factors are difficult or expensive to evaluate and score. Conservation Ontario selected two factors which are good indicators and are readily measured using province-wide aerial photography and desktop calculations based on a Geographic Information System (GIS): Forest Cover (Figure 3) and Forest Interior percentage.

An abundance of healthy forest cover is needed in southern Ontario to maintain good air and water quality, and the full diversity of native plants and animals. Historically this region was dominated by forests, with swamps extending across central Lambton County. Marshes were abundant near Lake St. Clair and prairies also evolved in the region. European settlement resulted in the clearing of most of the native vegetation.

Environment Canada (2004) recommends a goal of 30% Forest Cover to provide habitat for the full diversity of bird species. Conservation Ontario (2003) set an A grade for Forest Cover at more than 25.6%.

Forest Interior is the percentage of the forest which is more than 100 meters from the edge of the forest. Trees along the edge of the forest are more exposed

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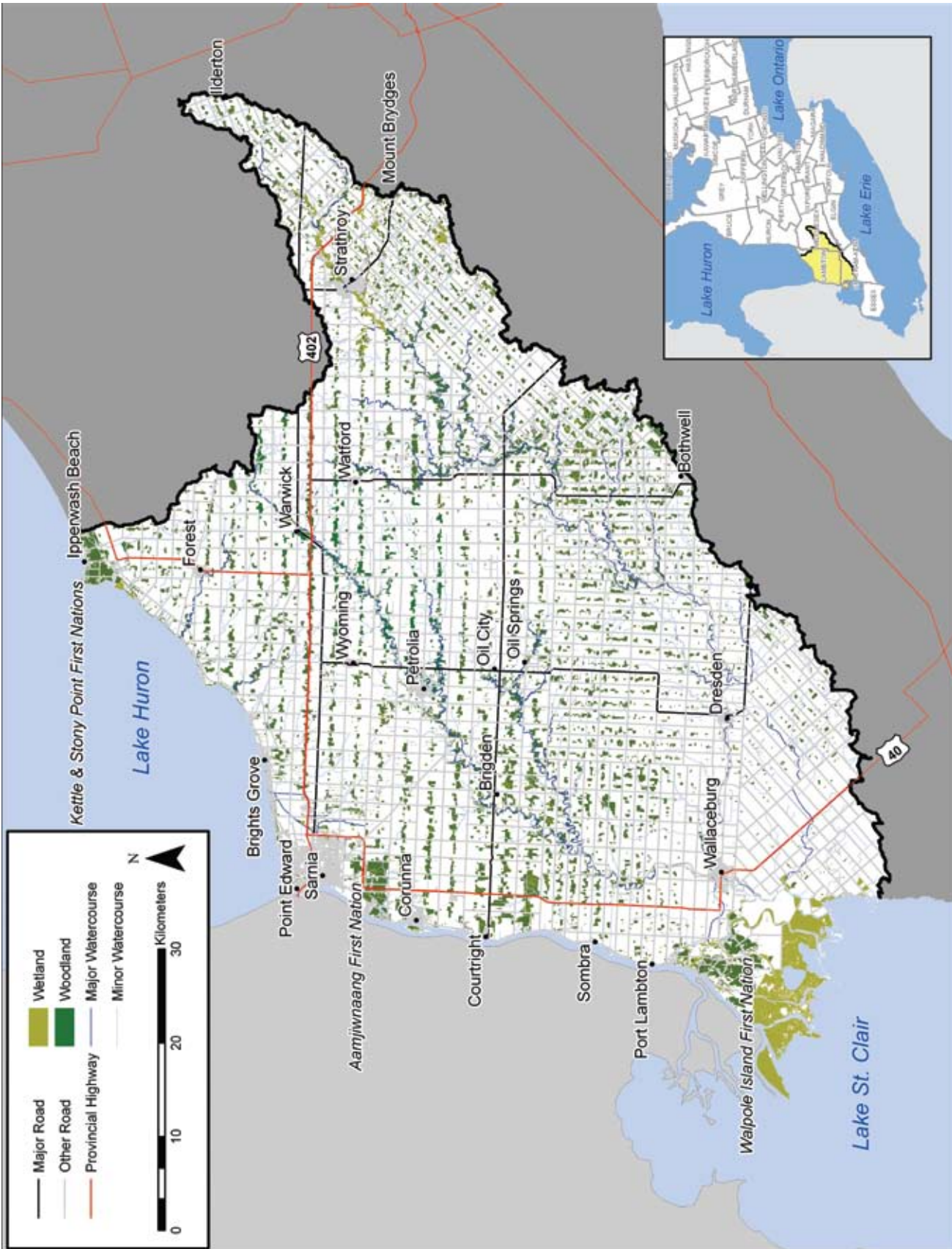


Figure 3: Wetland and Forest Cover within the St. Clair Region



to sun scald and wind throw; raccoons thrive, and nest parasites like brown-headed cowbirds reduce the survival of many bird species. Ontario songbirds like the wood thrush and scarlet tanager need interior forest to breed successfully.

Environment Canada (2004) has said that forest interior should be more than 10% of the forest to maintain the full range of area-sensitive birds. Conservation Ontario (2003) sets an A grade for Forest Interior at over 7.7% of the woodland.

The Forest Condition was graded using two indicators of equal weight: the percentage of the watershed covered in forest and the percentage of that forest which was interior forest. Forest Cover percentage was calculated for each watershed using the forest identified in the Geographic Information System (GIS) Forest layer from the Ontario Ministry of Natural Resources Southern Ontario Land Resources Information System (SOLRIS) aerial photography (OMNR 2000-2007). The Forest Interior percentage was calculated by digitally removing a 100-meter strip from the perimeter of each of the forests identified in the GIS layer, and calculating what area remained as a percentage of the total forest layer for that watershed. The analysis considered the cases where the buffer itself was in the abutting watershed. The Forest Cover percentage and Forest Interior percentage for the total St. Clair Region was also calculated.

The two indicators in each watershed, Forest Cover and Forest Interior percentages, were converted into a score and a grade using the Conservation Ontario guidelines (Table 1). These two scores were averaged for a watershed Forest Condition score and a grade from A to F.

Forest Cover (%)	Forest Interior (%)	Points	Grade
>25.6	>7.7	5	A
18.8 - 25.6	5.7 - 7.7	4	B
11.9 - 18.7	3.7 - 5.6	3	C
5.0 - 11.8	1.7 - 3.6	2	D
< 5.0	< 1.7	1	F

3.2 Surface Water Conditions – Method and Grading

The quality of the water in the surface creeks and rivers in the St. Clair Region is affected by soil types, weather, and both urban and rural land uses. For example, phosphorus adheres to soil and is readily transported to streams with eroding soil. A detailed analysis of water quality over the long term in this region is available in the Draft Watershed Characterization Report (SCRCA 2007), recently completed as part of the Drinking Water Source Protection program.

Conservation Ontario recommended Total Phosphorus as a key water quality indicator. The 75th percentile concentration of Total Phosphorus was calculated for all samples collected within each watershed from 2001 to 2005 inclusive. The 75th percentile is the value below which 75% of the values fall. This value reflects the water condition for the majority of the time. The 75th percentile value was converted into a score and a grade, following the Conservation Ontario guidelines (Table 2).

Phosphorus	Bacteria	Benthic Score	Points	Grade
< 0.03	0 - 10	< 5.00	5	A
0.03 - 0.10	11 - 100	5.00 - 5.75	4	B
0.11 - 0.17	101 - 1000	5.76 - 6.50	3	C
0.18 - 0.24	1001 - 10000	6.51 - 7.25	2	D
> 0.24	> 10000	> 7.25	1	F

The presence of E. coli is the second key water quality indicator of choice. E. coli is a fecal coliform bacteria found in human and animal waste. The presence of E. coli bacteria is a strong indicator there may be other disease-causing organisms in the watercourse. The concentration of E. coli can range from very low (less than 10 colony-forming units in 100 ml of water or CFU/100mL) up to over 10,000 CFU/100mL. The average value would inflate the conditions which are typically present, therefore the geometric mean or geomean is calculated. The geomean is calculated as the nth root of the product of n numbers. Following the Conservation Ontario guidelines, the five-year geomean was calculated for the monitoring sites which best reflect the outfall of each watershed.



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The third Surface Water Condition indicator which Conservation Ontario selected is based on the invertebrate organisms living on the bottom of the watercourse at a representative site in the watershed. Benthic refers to the bottom of a watercourse; macro refers to items large enough to see without a microscope, and invertebrates are organisms without a backbone, such as insects, worms and crustaceans. Benthic monitoring indices are a popular indicator of the water quality where these organisms live. The Family Biotic Index or FBI (Hilsenhoff 1988, Mandaville 2002) assigns a score to each family of benthic macroinvertebrates so the number and type of invertebrates found in each benthic sample relate to the water quality where they are collected. The larger the score, the more polluted the watercourse. A healthy aquatic environment is dominated by pollution intolerant species, and has a low FBI score.

The SCRCA has partnered with the Ontario Ministry of the Environment (OMOE) in the Provincial Water Quality Monitoring Network (PWQMN) since the 1960s. The location and number of stations varied, and in 2001 the only site in the PWQMN program in SCRCA was in Wallaceburg. In 2002 the program was revived by the Province of Ontario. In addition to sampling at Wallaceburg, the SCRCA restarted sampling at seven other PWQMN sites in the Sydenham River watershed. These eight "active" sites have been monitored eight times per year since 2002 (Figure 4). The samples are analyzed for 37 chemical parameters at the OMOE laboratory in Etobicoke.

In addition, eight water monitoring stations are sampled through partnering with OMOE under the Canada-Ontario Agreement (COA) on Great Lakes Water Quality. Six locations were established in 2004 and two in 2005. These samples are analyzed by OMOE for the same parameters as the PWQMN samples.

The SCRCA has partnered with the Middlesex and London Health Unit since 2003, to monitor fecal coliform bacteria in the Sydenham River. The Ministry of Health laboratory in London has analyzed surface water samples from the eight PWQMN stations for E. coli. The Health Unit data provides information for

seven watersheds on the Sydenham River. The seven watersheds outside of the Sydenham River did not have bacteria monitoring of the inland surface waters from 2001 to 2005.

The descriptions and sampling years of the sites used to determine the Surface Water Condition grades are summarized in Table 3.

The Conservation Ontario guidelines for Watershed Report Cards recommend that the water quality conditions be reported from the outlet of each watershed. This was possible for the water chemistry and bacteria indicators in the Sydenham watersheds, but not for the benthic indicators in many of the watersheds. Benthics must be sampled in a wadeable watercourse, and the outlets of many watersheds are too deep to wade. In five watersheds there is more than one watercourse, so one watercourse must be chosen for water chemistry sampling.

In the Sydenham watersheds, water chemistry and bacteria were sampled at the lowest bridge in eight watersheds, and water chemistry alone was sampled in one watershed. In the Lake St. Clair Tributaries, Little Bear Creek Drain water chemistry was monitored as representing the largest watercourse. In the St. Clair River Tributaries the sampling results from Clay Creek provide monitoring of the largest watercourse. In the Cow and Perch Creek area, Perch Creek was monitored at the second lowest bridge, as it experiences less backwater dilution from Lake Huron than the lower bridge. Two watersheds did not have water chemistry monitoring from 2001 to 2005. The Lambton Shores and Plympton Shoreline watersheds did not have any water chemistry sampling sites during this time period. Information from all 16 water chemistry sites and all 8 bacteria sites was used to calculate the grade of the whole St. Clair Region.

Benthic monitoring index

The SCRCA has been monitoring aquatic benthic macroinvertebrates since 1999. The variables which affect benthic conditions within one watershed include land use, catchment area, bank conditions, substrate

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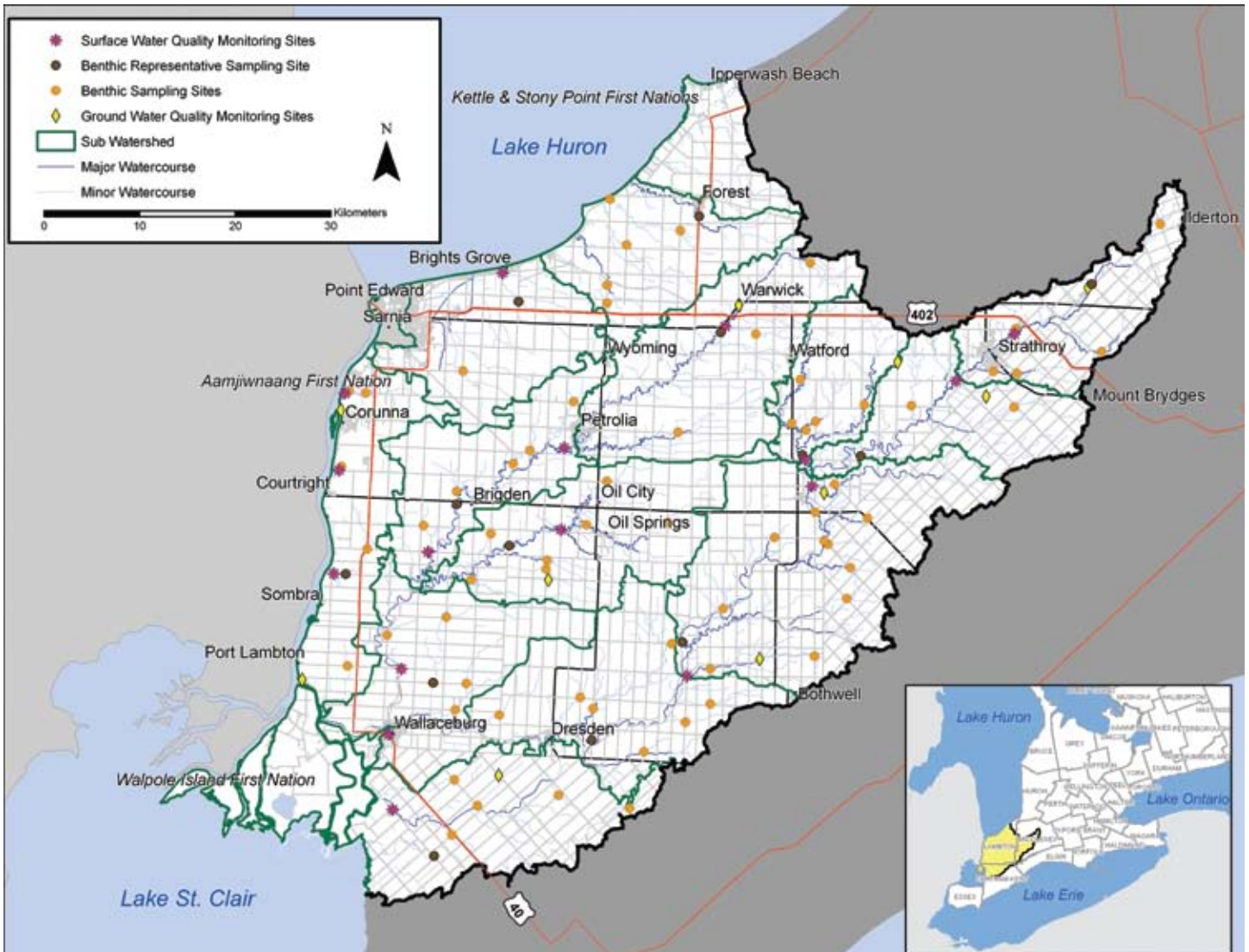


Figure 4: Location of Water Quality and Benthic Invertebrate Sampling Sites within the St. Clair Region

and flow conditions. Seventy-eight sites have been sampled across the region, which has illustrated a range of conditions within and between watersheds. Information from multiple sites within a watershed reflects local catchment areas, and may ultimately demonstrate the effects from land stewardship initiatives in the local area.

For the Report Card, Conservation Ontario recommended sampling the outlet of each watershed over five years, to reflect the cumulative impact of land uses. For the St. Clair Region we selected information from one representative benthic site for each watershed. This site was the lowest wadeable site

in eight of the Sydenham River watersheds, and a site near the outlet of the largest watercourse for three of the Great Lake Tributaries watersheds where there were multiple watercourses in the watershed. An exception was made for the Lower North Sydenham watershed where the main river is too deep to wade, so West Otter Creek Drain was selected. An exception was also necessary for the Lake St. Clair Tributaries watershed where the Rankin Creek Drain was selected, as it was the largest watercourse which could be safely waded.

There were no benthic samples collected in the Lambton Shores watershed since this region was not part of the SCRCA until November 2005.

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Table 3: Data Used to Determine Watershed Surface Water Condition Grades

Watershed	Site	Total Phosphorus		E coli		Benthic Representative Site		
		Year of data	# of samples	Year of data	# of samples	Site	Year of data	# of samples
Sydenham Headwaters	East Sydenham River at Hickory Drive	2002-2005	31	2003-2005	23	East Sydenham River at Coldstream Road	2001-2005	5
Upper Sydenham River	East Sydenham River at Shiloh Line	2002-2005	30	2003-2005	23	East Sydenham River at Sexton Road	2001-2005	5
Brown Creek	Brown Creek at Rokeby Line	2004-2005	16	no data	0	Brown Creek at Rokeby Line	2001-2005	5
Middle East Sydenham	East Sydenham River at Lambton Line	2002-2005	30	2003-2005	23	East Sydenham River east of Mawlam Road	2002-2005	4
Lower East Sydenham	Main Sydenham River at McNaughton Ave	2001-2005	65	2003-2005	23	East Sydenham River at Dawn Mills Road	2001-2005	5
Bear Creek Headwaters	Bear Creek at Marthaville Road	2002-2005	29	2003-2005	23	Bear Creek at Kingscourt Road	2001-2003, 2005	4
Lower Bear Creek	Bear Creek at Bickford Line	2002-2005	31	2003-2005	23	Bear Creek at Telfer Road	2001-2003, 2005	4
Black Creek	Black Creek at Marthaville Road	2002-2005	29	2003-2005	23	Black Creek at Mandaumin Road	2003, 2005	2
Lower North Sydenham	North Sydenham River at Lambton Line	2004-2005	16	no data	0	West Otter Creek Drain at Charlemont Line	2002-2005	4
Lambton Shores Tributaries	none	no data	0	no data	0	none	no data	0
Plympton Shoreline Tributaries	none	no data	0	no data	0	Hickory Creek at Forest Road	2001-2005	5
Cow and Perch Creeks	Cow Creek at Lakeshore Road	2004-2005	16	no data	0	Cow Creek at Mandaumin Road	2001-2005	5
St. Clair River	Clay Creek at White Line near C&O railroad	2005	8	no data	0	Clay Creek at White Line near Hwy 40	2003-2005	3
Lake St. Clair	Little Bear Creek at Bear Line Road	2004-2005	16	no data	0	Rankin Creek at Bear Line Road	2001-2005	5



3.3 Groundwater Conditions

The Provincial Groundwater Monitoring Network (PGMN) is a partnership between MOE and conservation authorities. This program was initiated in 2002 and there are nine sampling wells in the SCRCA. It was designed to collect ambient groundwater quality and quantity data. Only one complete round of sampling was completed from 2002 to 2005, which is judged to be insufficient data to characterize the groundwater. A written description of the groundwater is provided in the features section for each watershed.

4.0 Analysis

4.1 Forest Condition Results

The Forest Condition scores and grades are summarized in Table 4.

The majority of the watersheds (eight) of the St. Clair Region are grade D and six watersheds were grade C (Table 5). In most areas the Forest Interior is grade D or F with only Lambton Shores Tributaries and St. Clair River Tributaries having a C.

Table 4: Forest Condition Grades for all Watersheds

Watershed	Forest Cover			Forest Interior			Final	
	%	Score	Grade	%	Score	Grade	Score	Grade
Sydenham Headwaters	13.9	3	C	1.3	1	F	2.0	D
Upper Sydenham River	15.5	4	B	1.5	1	F	2.5	C
Brown Creek	12.2	3	C	1.9	2	D	2.5	C
Middle East Sydenham	14.5	3	C	2.3	2	D	2.5	C
Lower East Sydenham	5.9	2	D	0.4	1	F	1.5	D
Bear Creek Headwaters	11.8	2	D	1.7	2	D	2.0	D
Lower Bear Creek	14.7	3	C	2.4	2	D	2.5	C
Black Creek	13.0	3	C	2.1	2	D	2.5	C
Lower North Sydenham	9.4	2	D	1.1	1	F	1.5	D
Lambton Shores Tributaries	17.8	3	C	4.3	3	C	3.0	C
Plympton Shoreline Tributaries	10.9	2	D	1.6	1	F	1.5	D
Cow and Perch Creeks	8.9	2	D	0.9	1	F	1.5	D
St. Clair River Tributaries	14.9	3	C	3.7	3	C	3.0	C
Lake St. Clair Tributaries	5.8	2	D	1.7	2	D	2.0	D
Total St. Clair Region	11.5	2	D	1.8	2	D	2	D

Table 5: Watersheds Sorted by Forest Condition Grades

A	B	C	D	F
		Brown Creek	Sydenham Headwaters	
		Middle East Sydenham	Upper Sydenham River	
		Lower Bear Creek	Lower East Sydenham	
		Black Creek	Bear Creek Headwaters	
		Lambton Shores Tributaries	Lower North Sydenham	
		St. Clair River Tributaries	Plympton Shoreline Tributaries	
			Cow and Perch Creeks	
			Lake St. Clair Tributaries	



The Lambton Shores Tributaries watershed has the highest score for both Forest Cover (17.8%) and Forest Interior (4.3%). The woodland in this watershed is concentrated between Lakeshore Road and Lake Huron and includes Kettle and Stony Point First Nation and the former Ipperwash Provincial Park.

The Lake St. Clair Tributaries watershed has the lowest Forest Cover (5.8%) and the Lower East Sydenham has the lowest Forest Interior (0.4%).

4.2 Surface Water Condition Results

The Surface Water Condition scores and grades are summarized in Table 6. Half of the 14 watersheds scored a C grade for their surface water quality, with five B grades and one D grade (Table 7). The Lambton Shores Tributaries watershed is the region of Lambton Shores which joined the SCRCA in November 2005. As the SCRCA does not have any surface water quality data from this area for the time period 2001 to 2005, a surface water grade is not available for this watershed.

Table 6: Surface Water Quality Grades for all Watersheds

Watershed	Total Phosphorus			E coli			Benthic Score			Final	
	75th %ile	Score	Grade	Geo mean	Score	Grade	Aver FBI		Grade	Score	Grade
Sydenham Headwaters	0.09	4	B	297	3	C	5.6	4	B	3.7	B
Upper Sydenham River	0.09	4	B	152	3	C	5.9	3	C	3.3	C
Brown Creek	0.09	4	B	n/d			5.5	4	B	4.0	B
Middle East Sydenham	0.08	4	B	101	3	C	6.4	3	C	3.3	C
Lower East Sydenham	0.13	3	C	86	4	B	5.5	4	B	3.7	B
Bear Creek Headwaters	0.22	2	D	147	3	C	5.7	4	B	3.0	C
Lower Bear Creek	0.23	2	D	216	3	C	5.5	4	B	3.0	C
Black Creek	0.21	2	D	219	3	C	6.1	3	C	2.7	C
Lower North Sydenham	0.15	3	C	n/d			6.4	3	C	3.0	C
Lambton Shores Tributaries	n/d			n/d			n/d		n/d		n/d
Plympton Shoreline Tributaries	n/d			n/d			5.7	4	B	4.0	B
Cow and Perch Creeks	0.15	3	C	n/d			5.7	4	B	3.5	B
St. Clair River Tributaries	0.18	2	D	n/d			7.0	2	D	2.0	D
Lake St. Clair Tributaries	0.08	4	B	n/d			7.2	2	D	3.0	C
Total St. Clair Region	0.14	3	C	181	3	C	6.1	3	C	3.2	C

Table 7: Watersheds Sorted by Water Quality Grades

A	B	C	D	F
	Sydenham Headwaters	Upper Sydenham River	St. Clair River Tributaries	
	Brown Creek	Middle East Sydenham		
	Lower East Sydenham	Bear Creek Headwaters		
	Plympton Shoreline Tributaries	Lower Bear Creek		
	Cow and Perch Creeks	Black Creek		
		Lower North Sydenham		
		Lake St. Clair Tributaries		

Note: No data available for Lambton Shores Tributaries



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The grades for two of the watersheds with B grades, namely Plympton Shoreline Tributaries and Cow and Perch Creeks, are calculated without information on E. coli values for these areas. If the E. coli values for these watersheds and the Total Phosphorus value for Plympton Shoreline were grade C which was typical for the St. Clair Region, then these watersheds would have joined the majority of the watersheds with an average grade for Surface Water Condition of C.

The B grade for the Lower East Sydenham is probably influenced by dilution of the water monitoring samples from the St. Clair River or Lake St. Clair. The lower reaches of the Sydenham River are at the same elevation as Lake St. Clair, consequently backflow from the larger water bodies commonly affects water in the lower Sydenham River.

The watersheds which appear to have the best water quality are the Sydenham Headwaters and Brown Creek. These are both headwater reaches with small catchment areas, better than average forest cover and shallow unconfined aquifers.

The poorest water quality conditions are found in the St. Clair River Tributaries. The forest cover is concentrated in two areas (Aamjiwnaang and Bickford Oak Woods); 80% of the soils are silt and clay, and the only aquifer is at bedrock and does not influence surface water conditions.

Total Phosphorus

The Total Phosphorus readings were highest in Lower Bear Creek (0.23 mg/L), Bear Creek Headwaters (0.22 mg/L), Black Creek (0.21 mg/L) and St. Clair River Tributaries (0.18 mg/L) (Figure 5). The readings are illustrated in Figure 5, with the Ministry of the Environment Interim Provincial Water Quality Objective of 0.03 mg/L to prevent the nuisance growth of algae (MOE 1994) provided for reference.

One of the lowest Total Phosphorus readings was in the Lake St. Clair Tributaries watershed. The Lake St. Clair sampling location is influenced by dilution from Lake St. Clair and may need to be relocated to

provide a better reflection of the regional watershed influences. The watersheds which therefore have the best readings were in the upper four watersheds of the East Sydenham River.

Phosphorus concentrations are increased in erodible soils such as clay, as phosphorus adheres to soil particles. The highest phosphorus readings were recorded in watersheds in the clay plains of western Lambton County. The lower readings in the upper Sydenham may reflect soils such as loam and sands which are less erodible than clay. Clay soils which characterize much of the St. Clair Region are very slow to settle out of the water column, once they have been suspended.

E. coli

Six of the watersheds have a C grade for E. coli values. Only one area, the Lower East Sydenham, had a value within the MOE recreational guidelines (Figure 6). This value probably reflects dilutions from the St. Clair River rather than better water quality in the lower Sydenham watershed.

The normal E. coli concentrations are not known from seven of the St. Clair Region watersheds.

Benthic invertebrates

Half of the watersheds had a B benthic score, reflecting fair water conditions. Two watersheds, Lake St. Clair





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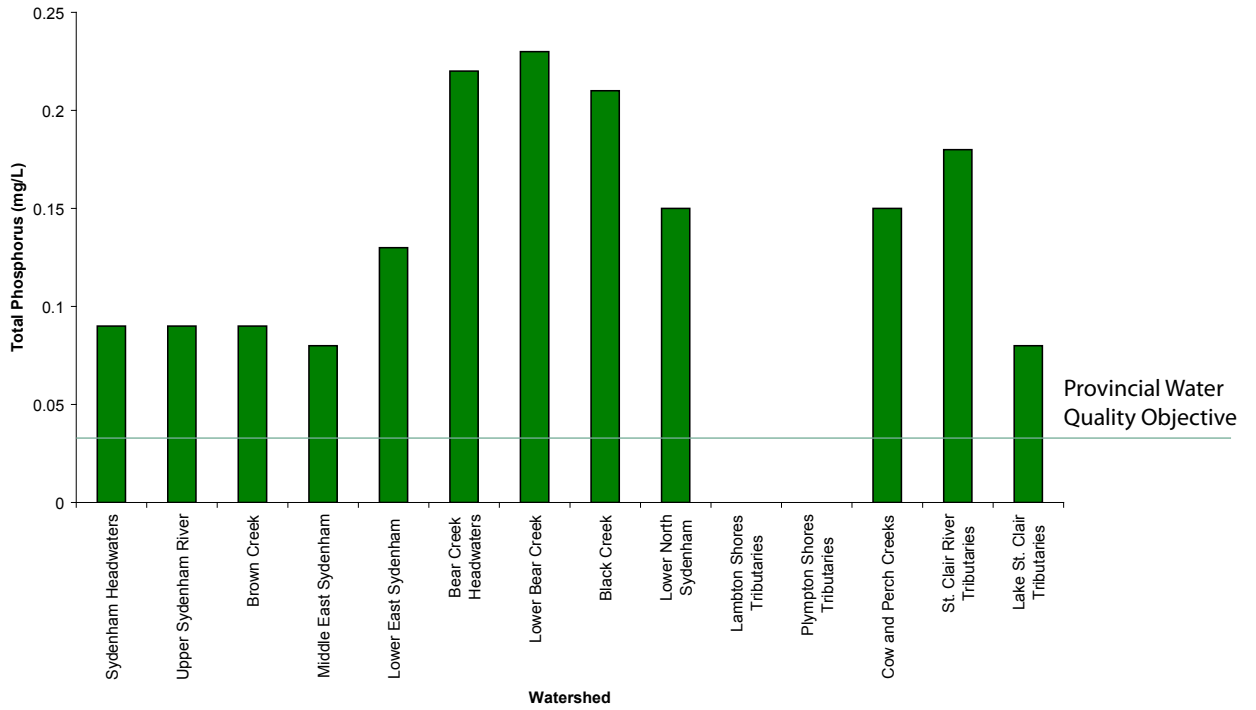


Figure 5: Total Phosphorus Concentrations across All Watersheds. The line represents the Ministry of the Environment Interim Provincial Water Quality Objective to prevent the nuisance growth of algae (0.03 mg/L).

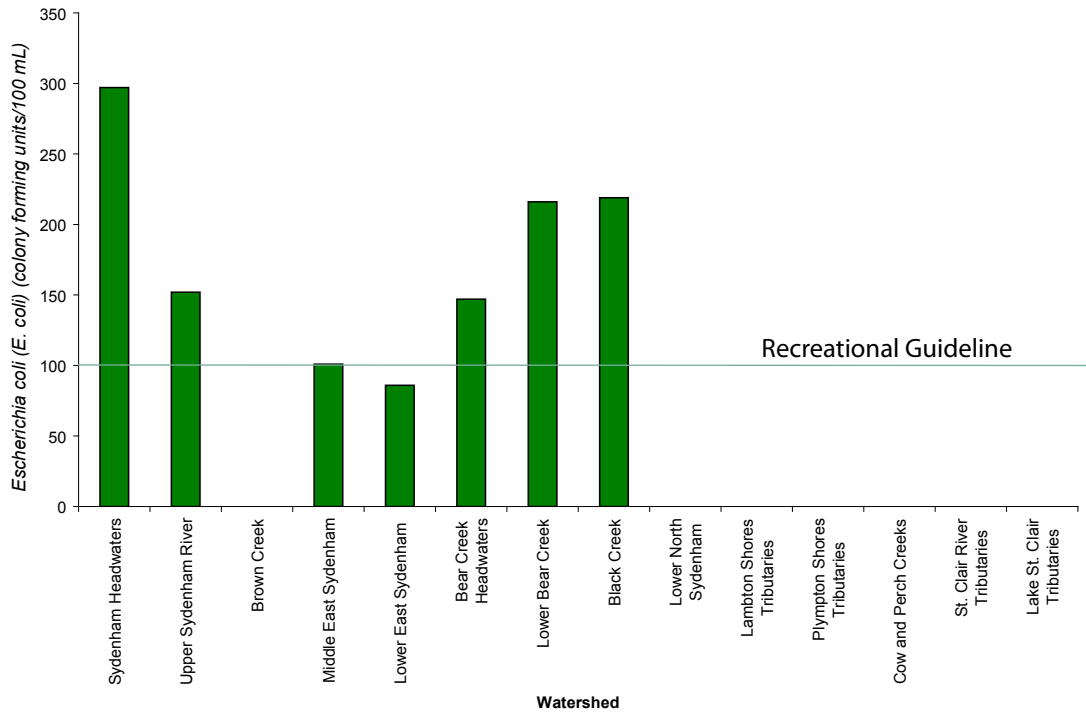


Figure 6: Escherichia coli (E. coli) Concentrations across All Watersheds. The line represents the Provincial Water Quality Objective for recreational waters (100 cfu/100 mL).



Tributaries and St. Clair River Tributaries, had D scores or fairly poor water conditions.

Following Conservation Ontario guidelines, the lowest wadeable site on the Sydenham River in eight of the Sydenham River watersheds was selected as the representative benthic site for the watershed. The one Sydenham watershed where the representative site was on a tributary of the Sydenham, rather than on the main river, had one of the most impacted benthic communities. Likewise, in the Lake St. Clair Tributaries where a relatively small watercourse was selected for the representative benthic sampling, the average benthic index was not as good as from larger watercourses in the other Great Lakes Tributaries watersheds.

Up to 78 sites have been sampled between 2001 and 2005, including many smaller watercourses. The average grade for all the benthic samples within a watershed have been either the same (7 of 13 watersheds) or worse (6 of 13 watersheds) than the grade of the representative benthic site. This suggests the smaller watercourses have more impacted benthic communities than the larger watercourses. To date, the sampling programs have not demonstrated a measurable response to land stewardship initiatives.

There were no benthic samples collected in the Lambton Shores watershed since this region was not part of the SCRCA until November 2005.

The current benthic scores indicate that the benthic invertebrates which survive in St. Clair Region watercourses must be tolerant of organic nutrient pollution from agricultural and residential sources.

4.3 Groundwater

Groundwater features have been described, using the general information provided in groundwater reports prepared for Chatham-Kent (Dillon Consulting and Golder Associates 2004a), Lambton County (Dillon Consulting and Golder Associates 2004b) and Middlesex County (Dillon Consulting and Golder Associates 2004c). The St Clair Region Source Protection Area Draft Watershed Characterization Report (SCRCA 2007) summarizes the known local groundwater quality data

using the provincial groundwater monitoring well records and municipal well records. There is insufficient data to assign grades to the Groundwater Conditions of the watersheds.

5.0 Discussion

Two of the water chemistry monitoring sites (Lower East Sydenham and Lake St. Clair Tributaries) appear to be influenced by Great Lakes waters. These sites may need to be relocated to provide a better reflection of the regional watershed influences.

Lambton Shores initiated a water quality monitoring program in July 2006 with a private consultant sampling at 34 locations throughout the municipality and analyses at a private laboratory for total phosphorous, nitrates and E. coli. This information will be valuable for the next Report Card.

E. coli monitoring would be valuable in more watersheds. Benthic sampling and surface water chemistry monitoring on a comparable scale to other parts of the region would be valuable information for environmental monitoring in Lambton Shores.

6.0 Summary

The forest conditions and surface water quality in the St. Clair Region have been heavily impacted by humans. Forest cover is limited. Water quality conditions are poor. These conditions reflect both natural features such as predominantly clay soils, and also intensive agricultural activities and some urbanization. By examining our area on small, ecologically relevant watershed units we can better identify areas to be protected and areas to be improved. For example, where an area lacks streamside cover landowners can be encouraged to provide permanent vegetated buffers along their watercourses. Best Management Practices which influence water quality can be encouraged in agricultural and urban areas. Areas with an abundance of fishes, Species at Risk and natural areas can be profiled and protected. Our region can be improved by individual and collective actions to protect or improve our environment.

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Appendix 1: Area of Watersheds

Watershed	km ²	acres	mi ²	% of total St. Clair Region
Sydenham Headwaters	224	55 330	87	5
Upper Sydenham River	229	56 640	88	6
Brown Creek	155	38 350	60	4
Middle East Sydenham	539	133 070	208	13
Lower East Sydenham	397	98 030	153	10
Bear Creek Headwaters	379	93 580	146	9
Lower Bear Creek	253	62 390	98	6
Black Creek	324	80 140	125	8
Lower North Sydenham	253	62 420	98	6
Lambton Shores Tributaries	127	31 280	49	3
Plympton Shoreline Tributaries	239	58 960	92	6
Cow and Perch Creeks	266	65 800	103	6
St. Clair River Tributaries	262	64 840	101	6
Lake St. Clair Tributaries	484	119 620	187	12
Total	4 131	1 020 450	1 595	100



Appendix 2: Municipalities and First Nations within each Watershed

Watersheds	Municipalities in declining order of area (left to right)					First Nations
Sydenham Headwaters	Middlesex Centre	Strathroy-Caradoc	Adelaide-Metcalfe			
Upper Sydenham River	Strathroy-Caradoc	Adelaide-Metcalfe	Southwest Middlesex	Brooke-Alvinston		
Brown Creek	Warwick	Adelaide-Metcalfe	Brooke-Alvinston			
Middle East Sydenham	Southwest Middlesex	Brooke-Alvinston	Dawn-Euphemia	Adelaide-Metcalfe		
Lower East Sydenham	Chatham-Kent	Dawn-Euphemia	St. Clair			
Bear Creek Headwaters	Warwick	Enniskillen	Plympton-Wyoming	Petrolia	Adelaide-Metcalfe	
Lower Bear Creek	St. Clair	Enniskillen	Plympton-Wyoming	Petrolia		
Black Creek	Enniskillen	Dawn-Euphemia	St. Clair	Brooke-Alvinston	Oil Springs	
Lower North Sydenham	St. Clair	Dawn-Euphemia	Chatham-Kent			
Lambton Shores Tributaries	Lambton Shores	Plympton-Wyoming				Kettle and Stony Point
Plympton Shoreline Tributaries	Plympton-Wyoming	Warwick	Lambton Shores			
Cow and Perch Creeks	Sarnia	Plympton-Wyoming	St. Clair	Enniskillen		
St. Clair River Tributaries	St. Clair	Sarnia	Chatham-Kent	Point Edward		Aamjiwnaang
Lake St. Clair Tributaries	Chatham-Kent					Walpole Island

Appendix 3: Streamside Cover

Watershed	Streamside Cover %
Sydenham Headwaters	34
Upper Sydenham River	26
Brown Creek	24
Middle East Sydenham	22
Lower East Sydenham	11
Bear Creek Headwaters	22
Lower Bear Creek	26
Black Creek	21
Lower North Sydenham	11
Lambton Shores	34
Plympton Shoreline Tributaries	22
Cow and Perch Creeks	14
St. Clair River Tributaries	20
Lake St. Clair Tributaries	3

Note: Streamside cover = Percentage of the watercourse which has trees or shrubs for at least 15 meters on both sides of the watercourse.

Appendix 4: Wetland Cover

Watershed	Watershed Area (km ²)	Watershed Area (ha)	Wetland Area (ha) SOLRIS data	% of Total Watershed
Sydenham Headwaters	224	223 910	9 200	4.1
Upper Sydenham River	229	229 170	3 900	1.7
Brown Creek	155	155 200	200	0.1
Middle East Sydenham	539	538 500	4 200	0.8
Lower East Sydenham	397	396 700	0	0.0
Bear Creek Headwaters	379	378 700	600	0.2
Lower Bear Creek	253	252 500	1 800	0.7
Black Creek	324	324 300	1 100	0.3
Lower North Sydenham	253	252 600	500	0.2
Lambton Shores	127	126 600	20	0.0
Plympton Shoreline Tributaries	239	238 600	100	0.0
Cow and Perch Creeks	266	266 300	400	0.2
St. Clair River Tributaries	262	262 371	2 600	1.0
Lake St. Clair Tributaries	484	484 100	6 400	1.3
Total	4 131	4 129 551	31 020	0.8



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Appendix 5: Significant Natural Sites			
Watershed	Provincially Significant Wetland	Locally Significant Wetland	Significant Natural Area/ESA
Sydenham Headwaters	Sydenham River Wetlands (in part) Komoka/South Strathroy Creek Wetlands (in part) South Ilderton Heronry Wetlands Gold Creek Wetland Telfer Woods and Wetland	Gold Creek Wetland	Coldstream Woodlot Vanneck Woods Ivan Woods Caradoc North Woods
Upper Sydenham River	Longwoods Woods and Wetland Sydenham River Wetlands (in part) Kerwood Swamp	Melwood Wetland	Brooke Township Sydenham Woods
Brown Creek	Walnut Heronry Woods Brown Creek Woods and Wetland		Kerwood Bluff
Middle East Sydenham	Skunks Misery Bobcat Swamp McCready Woods and Wetland Grape Fern Woods and Wetland Melbourne Marsh	Dawn Euphemia Woods and Wetland McPhail Woodland Tract and Wetland Highway 79 – Euphemia Woods and Wetland West Newbury Wetland Euphemia Woodlot	Skunks Misery Area of Natural and Scientific Interest and Carolinian Canada Site Sydenham River Corridor Carolinian Canada Site Shetland Heronry Shetland Kentucky Coffee-tree Grove Carolinian Canada Site Knapdale Woods Newbury Woods Cairo Woods County Line Woods Cottonwood Swamp Fansher Creek Natural Area Shields Woods A.W. Campbell Conservation Area Sinclair Management Area



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Watershed	Provincially Significant Wetland	Locally Significant Wetland	Significant Natural Area/ESA
Lower East Sydenham	Deyo's or Dare's Woods		Langbank Woods Huff's Corners Woods Rutherford Woods
Bear Creek Headwaters	Warwick Conservation Area Wetlands	Bear Creek Source Woods and Wetland Bridgeview Wetlands	Little Bear Creek Natural Area Bear Creek Woodlot #1 Highway 402 Woods
Lower Bear Creek	Moore Wildlife Management Area (Bear Creek Woods #4) and Wetland Burton Drain Woods #3 and Wetland	Bear Creek Woods #3 and Wetland Brigden Crown Game Reserve Wetland Lorne C. Henderson Conservation Area (Bear Creek Woods #2) Wetlands	Bear Creek Floodplain and Tableland Woods Area of Natural and Scientific Interest and Carolinian Canada Site Waubuno Woods Burton Drain Woods #2 Nichol Creek Woods
Black Creek		Plum Creek Woods and Wetland Black Creek Woods #1 (Fox Creek Woods) and Wetland	Plum Creek Upland Woods Area of Natural and Scientific Interest Bickford Line Woods Black Creek Natural Area #2
Lower North Sydenham	Snye River Marshes Reid Conservation Area (Duthill Woods #2) and Wetlands	Chicken Island Wetland McKeough Grant's Wetland	Wallaceburg Woods McKeough Conservation Area (Duthill Woods #1) Wilkesport Woods Combine Woods Terminus Woods McKeough Lands McKeough Floodway



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Watershed	Provincially Significant Wetland	Locally Significant Wetland	Significant Natural Area/ESA
Lambton Shores Tributaries			Cedar Point, Ipperwash Natural Areas Shashawandah Creek / Lakeshore Marsh Complex Jericho Creek/Mud Creek Woods Port Franks Natural Areas
Plympton Shoreline Tributaries		Uttoxeter Swamp Plympton/Warwick Woods and Wetland	Kettle and Stony Point First Nations Aberarder Creek Woods Egremont Road Woods Blue Point Woods Highland Creek Conservation Area Esli Dodge Conservation Area Charles McEwen Conservation Area





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Watershed	Provincially Significant Wetland	Locally Significant Wetland	Significant Natural Area/ESA
Cow and Perch Creeks	Wawanosh Conservation Area Wetlands	Perch Creek Wetland	Highway 402 Woods Brights Grove Lagoons Reeces Corners Gravel Pits Camlachie Woods Jackson Drive Woods Deptford Pink Woods Mandaumin Nature Reserve Blackwell Prairie/Howard Watson Nature Trail Logans Pond Saredaca Woods Suncor Natureway Mossy Marsh Perch Creek Wildlife Management Area and Wetland Dennis Rupert Prairie
St. Clair River Tributaries	Stag Island Natural Area and Wetland Marshy Creek Marsh		Aamjiwnaang First Nation Sassafras Woods Sombra Sycamore Woods Upland Plover Woods Spice Bush Woods Fertilizer Plant Woods Bickford Oak Woods (Clay Creek Woods) Indian Pipe Woods Payne Woods Hydro Plant Woods Dow Wetlands



St. Clair Region Watershed Report Card

Watershed	Provincially Significant Wetland	Locally Significant Wetland	Significant Natural Area/ESA
Lake St. Clair Tributaries	Lake St. Clair Marshes and Area of Natural and Scientific Interest Chenal Ecarte Marshes		Walpole Island First Nation Chenal Ecarte Prairie



Appendix 6: Species of Concern and at Risk

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
Sydenham Headwaters						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	False Hop Sedge	<i>Carex lupuliformis</i>	Plant	END	END-R	S1
	American Chestnut	<i>Castanea dentata</i>	Plant	END	END-NR	S2
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Willowleaf Aster	<i>Symphyotrichum praealtum</i>	Plant	THR	THR	S2
	Drooping Trillium	<i>Trillium flexipes</i>	Plant	END	END-R	S1
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Blanding's Turtle	<i>Emys blandingii</i>	Reptile	THR	THR	S3
	Eastern Hognose Snake	<i>Heterodon platirhinos</i>	Reptile	THR	THR	S3
	Yellow-breasted Chat	<i>Icteria virens</i>	Bird	SC	SC	S2S3B
	Brindled Madtom	<i>Noturus miurus</i>	Fish	NAR	NAR	S2
Upper Sydenham River						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	American Chestnut	<i>Castanea dentata</i>	Plant	END	END-NR	S2
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Eastern Hognose Snake	<i>Heterodon platirhinos</i>	Reptile	THR	THR	S3
	Snuffbox	<i>Epioblasma triquetra</i>	Mussel	END	END	S1
	Wavyrayed Lampmussel	<i>Lampsilis fasciola</i>	Mussel	END	END	S1
	Round Hickorynut	<i>Obovaria subrotunda</i>	Mussel	END	END	S1
	Round Pigtoe	<i>Pleurobema sintoxia</i>	Mussel	END		S1
	Kidneyshell	<i>Ptychobranhus fasciola</i>	Mussel	END	END	S1
	Rayed Bean	<i>Villosa fabalis</i>	Mussel	END	END	S1
Brown Creek						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Eastern Hognose Snake	<i>Heterodon platirhinos</i>	Reptile	THR	THR	S3
	Round Hickorynut	<i>Obovaria subrotunda</i>	Mussel	END	END	S1
	Kidneyshell	<i>Ptychobranhus fasciola</i>	Mussel	END	END	S1

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Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
Middle East Sydenham						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	American Chestnut	<i>Castanea dentata</i>	Plant	END	END-NR	S2
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Small White Lady's-slipper	<i>Cypripedium candidum</i>	Plant	END	END-R	S1
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Prairie Rose	<i>Rosa setigera</i>	Plant	SC	SC	S3
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Northern Map Turtle	<i>Graptemys geographica</i>	Reptile	SC	SC	S3
	Eastern Ratsnake	<i>Elaphe obsoleta</i>	Reptile	THR	THR	S3
	Milksnake	<i>Lampropeltis triangulum</i>	Reptile	SC	SC	S3
	Common Musk Turtle	<i>Sternotherus odoratus</i>	Reptile	THR	THR	S3
	Blanding's Turtle	<i>Emys blandingii</i>	Reptile	THR	THR	S3
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2
	Eastern Hognose Snake	<i>Heterodon platirhinos</i>	Reptile	THR	THR	S3
	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	Reptile	SC	SC	S3
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2
	Cerulean Warbler	<i>Dendroica cerulea</i>	Bird	SC	SC	S3B
	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Bird	SC	SC	S3B
	Prairie Warbler	<i>Dendroica discolor</i>	Bird	NAR	NAR	S3S4B
	Acadian Flycatcher	<i>Empidonax virescens</i>	Bird	END	END	S2B
	Prothonotary Warbler	<i>Protonotaria citrea</i>	Bird	END	END-R	S1S2B
	Hooded Warbler	<i>Wilsonia citrina</i>	Bird	THR	THR	S3B
	Eastern Sand Darter	<i>Ammocrypta pellucida</i>	Fish	THR	THR	S2
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Brindled Madtom	<i>Noturus miuris</i>	Fish	NAR	NAR	S2
	Northern Riffleshell	<i>Epioblasma torulosa rangiana</i>	Mussel	END	END	S1
	Snuffbox	<i>Epioblasma triquetra</i>	Mussel	END	END	S1
	Wavyrayed Lampmussel	<i>Lampsilis fasciola</i>	Mussel	END	END	S1
	Kidneyshell	<i>Ptychobranthus fasciola</i>	Mussel	END	END	S1
	Round Hickorynut	<i>Obovaria subrotunda</i>	Mussel	END	END	S1
	Rayed Bean	<i>Villosa fabalis</i>	Mussel	END	END	S1
	Round Pigtoe	<i>Pleurobema sintoxia</i>	Mussel	END		S1

St. Clair Region Watershed Report Card

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
	Mudpuppy Mussel	<i>Simpsonaias ambigua</i>	Mussel	END	END	S1
	American Badger	<i>Taxidea taxus</i>	Mammal	END	END	S2
Lower East Sydenham						
	Colicroot	<i>Aletris farinosa</i>	Plant	THR	THR	S2
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Purple Twayblade	<i>Liparis liliifolia</i>	Plant	END	END-NR	S2
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Eastern Foxsnake	<i>Elaphe gloydi</i>	Reptile	THR	THR	S3
	Common Map Turtle	<i>Graptemys geographica</i>	Reptile	SC	SC	S3
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2
	Eastern Sand Darter	<i>Ammocrypta pellucida</i>	Fish	THR	THR	S2
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Spotted Gar	<i>Lepisosteus oculatus</i>	Fish	THR	THR	S2
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Ghost Shiner	<i>Notropis buchanani</i>	Fish	NAR	NAR	S2
	Brindled Madtom	<i>Noturus miuris</i>	Fish	NAR	NAR	S2
	Northern Riffleshell	<i>Epioblasma torulosa rangiana</i>	Mussel	END	END	S1
	Snuffbox	<i>Epioblasma triquetra</i>	Mussel	END	END	S1
	Mudpuppy Mussel	<i>Simpsonaias ambigua</i>	Mussel	END	END	S1
	Kidneyshell	<i>Ptychobranchnus fasciola</i>	Mussel	END	END	S1
	Round Pigtoe	<i>Pleurobema sintoxia</i>	Mussel	END		S1
	Round Hickorynut	<i>Obovaria subrotunda</i>	Mussel	END	END	S1
	Wavyrayed Lampmussel	<i>Lampsilis fasciola</i>	Mussel	END	END	S1
	Rayed Bean	<i>Villosa fabalis</i>	Mussel	END	END	S1
Bear Creek Headwaters						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Loggerhead Shrike	<i>Lanius ludovicianus</i>	Bird	END	END-R	S2B
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Brindled Madtom	<i>Noturus miuris</i>	Fish	NAR	NAR	S2



St. Clair Region Watershed Report Card

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
	Round Pigtoe	<i>Pleurobema sintoxia</i>	Mussel	END		S1
	Mudpuppy Mussel	<i>Simpsonias ambigua</i>	Mussel	END	END	S1
	Gray Fox	<i>Urocyon cinereoargenteus</i>	Mammal	THR	THR	SNA
Lower Bear Creek						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	Fish	SC	SC	SU
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
Black Creek						
	Colicroot	<i>Aletris farinosa</i>	Plant	THR	THR	S2
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	Fish	SC	SC	SU
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Golden Redhorse	<i>Moxostoma erythrurum</i>	Fish	NAR	NAR	S4
Lower North Sydenham						
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Riddell's Goldenrod	<i>Oligoneuron riddellii</i>	Plant	SC	SC	S3
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Prairie Rose	<i>Rosa setigera</i>	Plant	SC	SC	S3
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Eastern Foxsnake	<i>Elaphe gloydi</i>	Reptile	THR	THR	S3
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2



St. Clair Region Watershed Report Card

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	Fish	SC	SC	SU
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Golden Redhorse	<i>Moxostoma erythrurum</i>	Fish	NAR	NAR	S4
	Ghost Shiner	<i>Notropis buchanani</i>	Fish	NAR	NAR	S2
Lambton Shores Tributaries						
	Bluehearts	<i>Buchnera americana</i>	Plant	END	END-NR	S1
	Dune Thistle	<i>Cirsium pitcheri</i>	Plant	END	END-NR	S2
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Broad Beech Fern	<i>Phegopteris hexagonoptera</i>	Plant	SC	SC	S3
	Heartleaf Plantain	<i>Plantago cordata</i>	Plant	END	END-R	S1
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Eastern Foxsnake	<i>Elaphe gloydi</i>	Reptile	THR	THR	S3
	Blanding's Turtle	<i>Emys blandingii</i>	Reptile	THR	THR	S3
	Northern Map Turtle	<i>Graptemys geographica</i>	Reptile	SC	SC	S3
	Eastern Hognose Snake	<i>Heterodon platirhinus</i>	Reptile	THR	THR	S3
	Milksnake	<i>Lampropeltis triangulum</i>	Reptile	SC	SC	S3
	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	Reptile	SC	SC	S3
	Acadian Flycatcher	<i>Empidonax vireescens</i>	Bird	END	END	S2B
	Forster's Tern	<i>Sterna forsteri</i>	Bird	DD	DD	S2S3B
	Hooded Warbler	<i>Wilsonia citrina</i>	Bird	THR	THR	S3B
Plympton Shoreline Tributaries						
	Green Dragon	<i>Arisaema dracontium</i>	Plant	SC	SC	S3
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Milksnake	<i>Lampropeltis triangulum</i>	Reptile	SC	SC	S3
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2
	Loggerhead Shrike	<i>Lanius ludovicianus</i>	Bird	END	END-R	S2B
Cow and Perch Creeks						
	Colicroot	<i>Aletris farinosa</i>	Plant	THR	THR	S2
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Riddell's Goldenrod	<i>Oligoneuron riddellii</i>	Plant	SC	SC	S3
	Willow Aster	<i>Symphotrichum praealtum</i>	Plant	THR	THR	S2
	Bird's-foot Violet	<i>Viola pedata</i>	Plant	END	END-R	S1
	Blanding's Turtle	<i>Emys blandingii</i>	Reptile	THR	THR	S3
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2

St. Clair Region Watershed Report Card

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
St. Clair River Tributaries						
	Colicroot	<i>Aletris farinosa</i>	Plant	THR	THR	S2
	American Columbo	<i>Frasera caroliniensis</i>	Plant	SC	SC	S2
	Blue Ash	<i>Fraxinus quadrangulata</i>	Plant	SC	SC	S3
	Swamp Rosemallow	<i>Hibiscus moscheutos</i>	Plant	SC	SC	S3
	Butternut	<i>Juglans cinerea</i>	Plant	END	END-NR	S3?
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Shumard Oak	<i>Quercus shumardii</i>	Plant	SC	SC	S3
	Prairie Rose	<i>Rosa setigera</i>	Plant	SC	SC	S3
	Willow Aster	<i>Symphotrichum praealtum</i>	Plant	THR	THR	S2
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Eastern Foxsnake	<i>Elaphe gloydi</i>	Reptile	THR	THR	S3
	Eastern Hognose Snake	<i>Heterodon platirhinus</i>	Reptile	THR	THR	S3
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2
	Least Bittern	<i>Ixobrychus exilis</i>	Bird	THR	THR	S3B
	Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	Fish	SC	SC	SU
	Striped Shiner	<i>Luxilus chrysocephalus</i>	Fish	NAR	NAR	S4
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Golden Redhorse	<i>Moxostoma erythrurum</i>	Fish	NAR	NAR	S4
	Ghost Shiner	<i>Notropis buchanani</i>	Fish	NAR	NAR	S2
	Channel Darter	<i>Percina copelandii</i>	Fish	THR	THR	S2
Lake St. Clair Tributaries						
	Colicroot	<i>Aletris farinosa</i>	Plant	THR	THR	S2
	Small White Lady's-slipper	<i>Cypripedium candidum</i>	Plant	END	END-R	S1
	Hill's Thistle	<i>Cirsium hillii</i>	Plant	THR	THR	S3
	Swamp Rosemallow	<i>Hibiscus moscheutos</i>	Plant	SC	SC	S3
	White Prairie Gentian	<i>Gentiana alba</i>	Plant	END	END-NR	S1
	American Chestnut	<i>Castanea dentata</i>	Plant	END	END-NR	S2
	Dense Blazingstar	<i>Liatris spicata</i>	Plant	THR	THR	S2
	Kentucky Coffee-tree	<i>Gymnocladus dioicus</i>	Plant	THR	THR	S2
	Purple Twayblade	<i>Liparis liliifolia</i>	Plant	END	END-NR	S2
	Riddell's Goldenrod	<i>Oligoneuron riddellii</i>	Plant	SC	SC	S3
	Eastern Prairie White-fringed Orchid	<i>Plantanthera leucophaea</i>	Plant	END	END-NR	S2
	Pink Milkwort	<i>Polygala incarnata</i>	Plant	END	END-R	S1



St. Clair Region Watershed Report Card

Watershed	Common Name	Scientific Name	Type of organism	COSEWIC	SARO	SRANK
	Common Hoptree	<i>Ptelea trifoliata</i>	Plant	THR	THR	S3
	Prairie Rose	<i>Rosa setigera</i>	Plant	SC	SC	S3
	Willow Aster	<i>Symphotrichum praealtum</i>	Plant	THR	THR	S2
	Spiny Softshell Turtle	<i>Apalone spinifera</i>	Reptile	THR	THR	S3
	Northern Map Turtle	<i>Graptemys geographica</i>	Reptile	SC	SC	S3
	Eastern Foxsnake	<i>Elaphe gloydi</i>	Reptile	THR	THR	S3
	Milksnake	<i>Lampropeltis triangulum</i>	Reptile	SC	SC	S3
	Blanding's Turtle	<i>Emys blandingii</i>	Reptile	THR	THR	S3
	Queen Snake	<i>Regina septemvittata</i>	Reptile	THR	THR	S2
	Butler's Gartersnake	<i>Thamnophis butlerii</i>	Reptile	THR	THR	S2
	Northern Bobwhite	<i>Colinus virginianus</i>	Bird	END	END	S1S2
	Least Bittern	<i>Ixobrychus exilis</i>	Bird	THR	THR	S3B
	Black Tern	<i>Chlidonias niger</i>	Bird	NAR	SC	S3B
	Yellow-breasted Chat	<i>Icteria virens</i>	Bird	SC	SC	S2S3B
	Cerulean Warbler	<i>Dendroica cerulea</i>	Bird	SC	SC	S3B
	King Rail	<i>Rallus elegans</i>	Bird	END	END-R	S2B
	Forster's Tern	<i>Sterna forsteri</i>	Bird	DD	DD	S2S3B
	Eastern Sand Darter	<i>Ammocrypta pellucida</i>	Fish	THR	THR	S2
	Blackstripe Topminnow	<i>Fundulus notatus</i>	Fish	SC	SC	S2
	Grass Pickerel	<i>Esox americanus</i>	Fish	SC		S3
	Lake Chubsucker	<i>Erimyzon sucetta</i>	Fish	THR	THR	S2
	Striped Shiner	<i>Luxilus chrysocephalus</i>	Fish	NAR	NAR	S4
	Spotted Sucker	<i>Minytrema melanops</i>	Fish	SC	SC	S2
	Golden Redhorse	<i>Moxostoma erythrurum</i>	Fish	NAR	NAR	S4
	Channel Darter	<i>Percina copelandii</i>	Fish	THR	THR	S2
	Pugnose Shiner	<i>Notropis anogenus</i>	Fish	END	END	S2
	Ghost Shiner	<i>Notropis buechanani</i>	Fish	NAR	NAR	S2
	Brindled Madtom	<i>Noturus miuris</i>	Fish	NAR	NAR	S2
	Round Pigtoe	<i>Pleurobema sintoxia</i>	Mussel	END		S1
	Kidneyshell	<i>Ptychobranhus fasciola</i>	Mussel	END	END	S1

NOTES: COSEWIC = Committee on the Status of Endangered Wildlife in Canada. SARO = Species at Risk in Ontario, designated by OMNR in accordance with the provincial Endangered Species Act. SRANK = Provincial rank based on Committee On the Status of Species At Risk in Ontario (COSSARO). END = Endangered. THR = Threatened. SC = Special Concern. NAR = Not At Risk. S1 = Extremely rare. S2 = Very rare. S3 = Rare to uncommon. S4 = Common. S4B = Breeding habitat ranking. DD = Data Deficient. END-R = Endangered - Regulated. END-NR = Endangered - Not Regulated. SU = Unranked.

8.0 Individual Watershed Report Cards

Sydenham Headwaters
Upper Sydenham River
Brown Creek
Middle East Sydenham
Lower East Sydenham
Bear Creek Headwaters
Lower Bear Creek
Black Creek
Lower North Sydenham
Lambton Shores Tributaries
Plympton Shoreline Tributaries
Cow and Perch Creeks
St. Clair River Tributaries
Lake St. Clair Tributaries



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