



# LAKE FACT SHEET ( 2017 )

# SYDENHAM LAKE



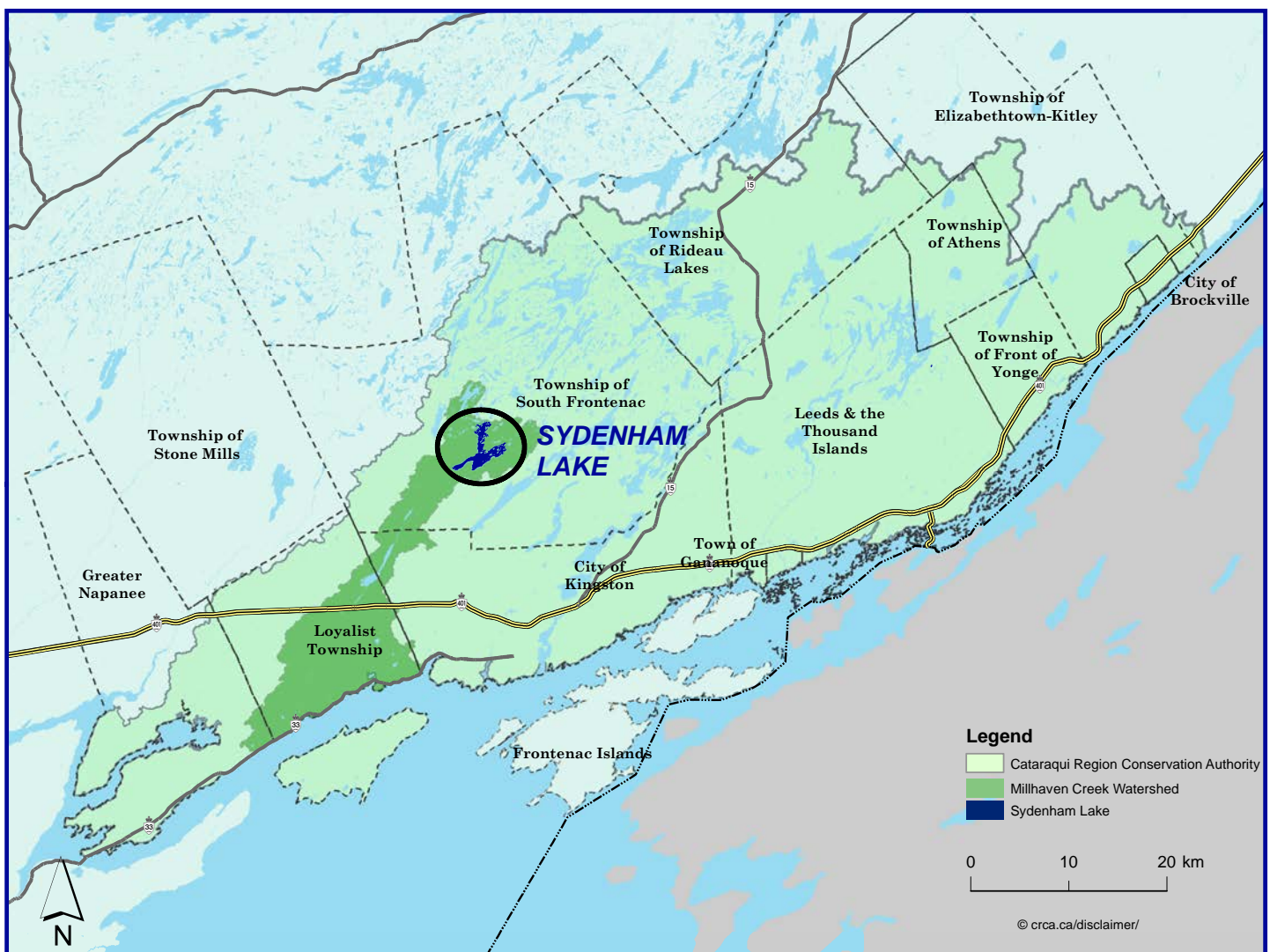
CATARAQUI REGION  
CONSERVATION AUTHORITY



# LAKE FACT SHEETS

The Cataraqi Region Conservation Authority (CRCA) has provided environmental leadership and service to local communities since 1964. It is one of 36 watershed-based agencies within Ontario dedicated to the conservation and protection of the natural environment through a variety of management tools including land ownership, education, monitoring, reporting and regulation.

To learn more about the lakes in our region, the CRCA and partners collect samples, take measurements and compare this information against established standards to identify any significant changes or areas of concern. This Lake Fact Sheet focuses on key parameters to assess the health and resilience of Sydenham Lake with respect to nutrient loading, invasive species colonization and acidification.

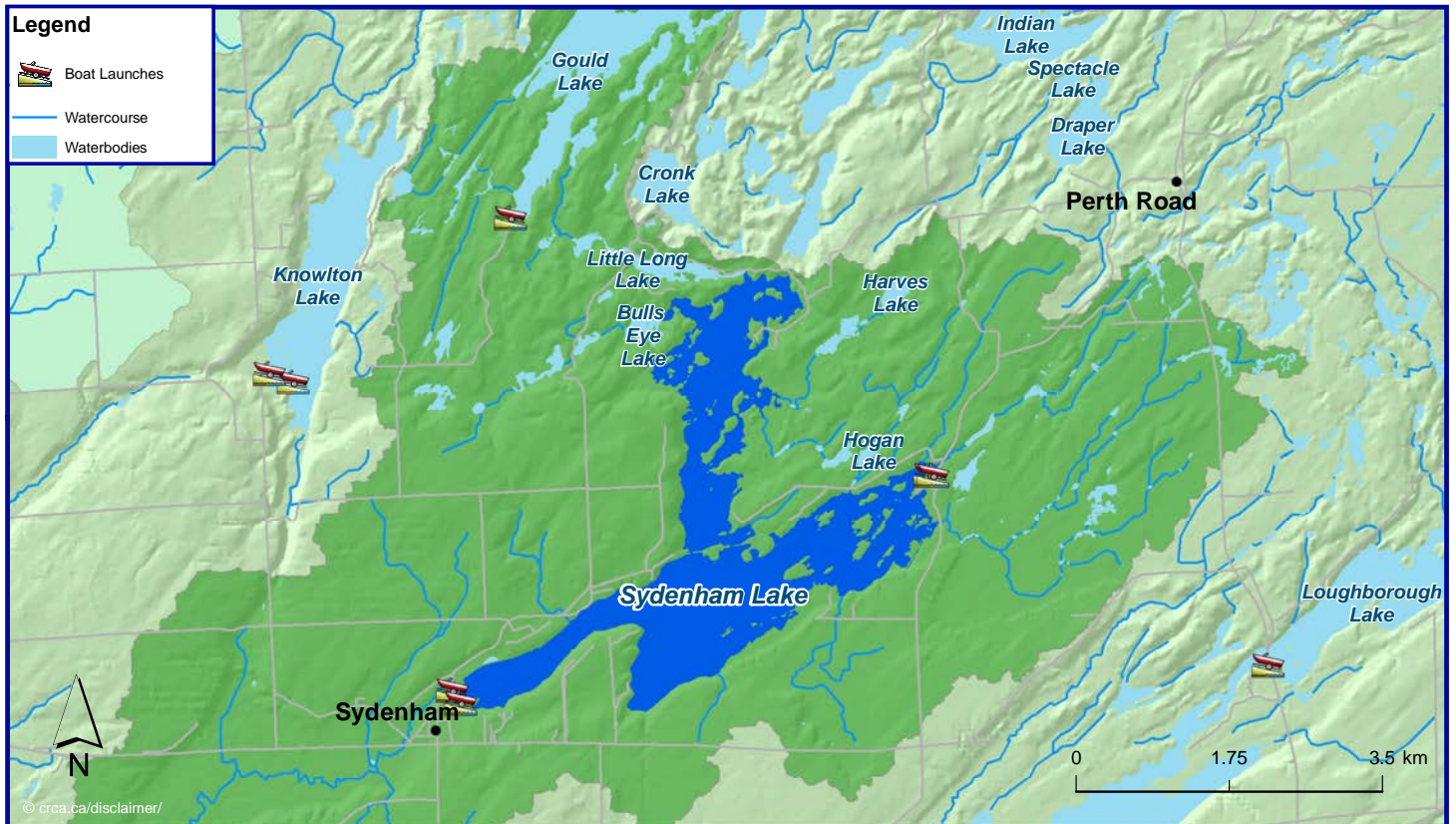






# SYDENHAM LAKE

Sydenham Lake is located in the Millhaven Creek watershed adjacent to the community of Sydenham. Nearby lakes include Knowlton Lake, Gould Lake, Cronk Lake, Draper Lake, Little Long Lake, Bulls Eye Lake, Harves Lake, Hogan Lake, and Loughborough Lake.



**County:** County of Frontenac

**Municipality:** Township of South Frontenac

**Watershed:** Millhaven Creek

**Coordinates:** 44.422 Lat., -76.557 Long.

**Average Depth (m):** 7.20

**Volume (m<sup>3</sup> x10<sup>6</sup>):** 32.1

**SURFACE AREA (HA)**

**780**

**MAX. DEPTH (M)**

**36.6**

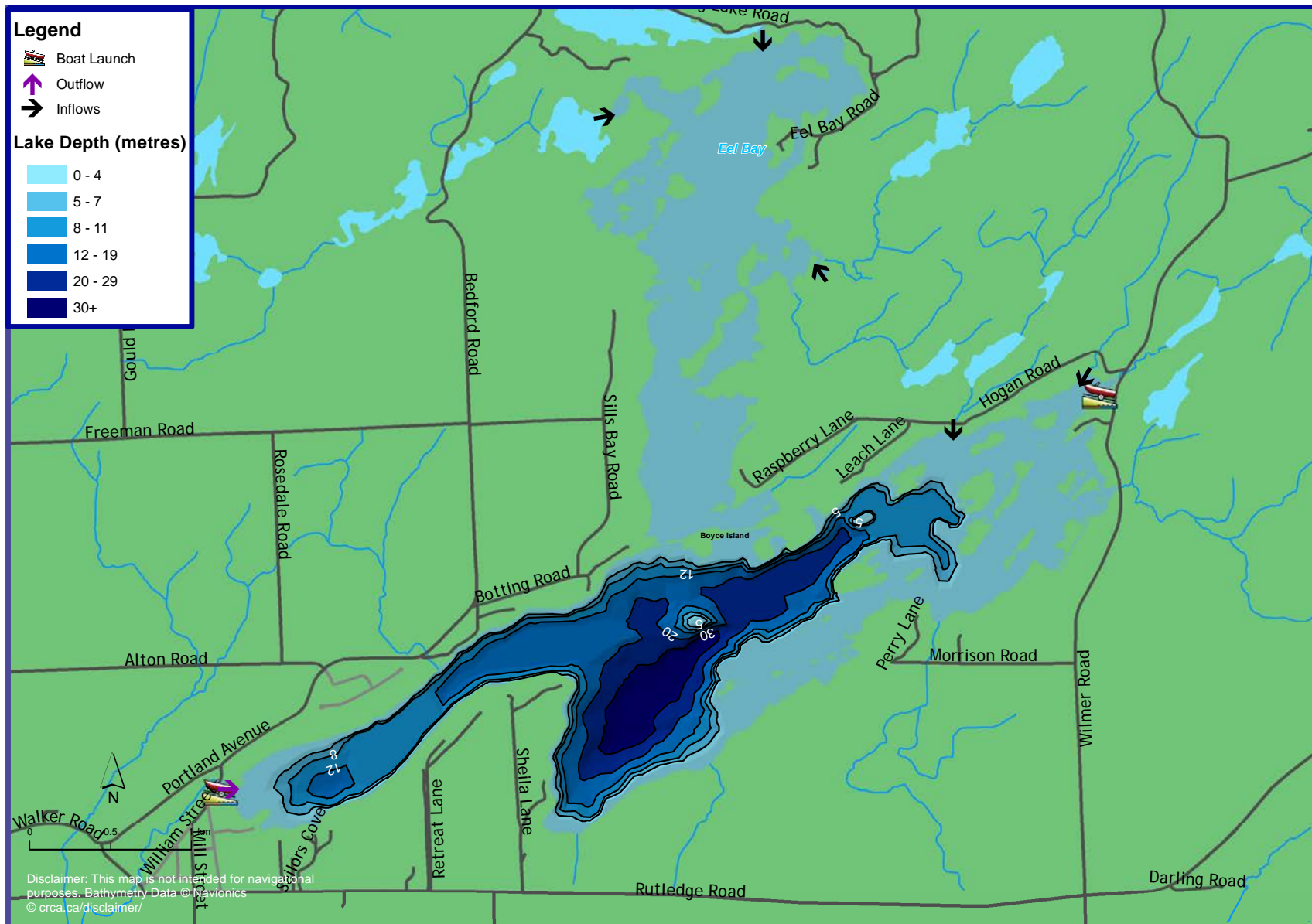
**SHORE LENGTH (KM)**

**53.9**



# LOCATION & BATHYMETRY

The map below shows water depths and the topography of the lake bottom (bathymetry), as well as the direction of water flow. Sydenham Lake is composed of two distinct basins (Sydenham Lake and Eel Bay to the north). Water flows into Sydenham Lake from Little Long Lake, Bull's Eye Lake, Hogan Lake and a creek outlet originating from Lower Awada Lake. Sydenham Lake flows out to Millhaven Creek.





# LAKE CHARACTERISTICS

Sydenham Lake is a natural, deep lake enhanced by the construction of a dam. The southern majority of the lake overlies limestone while a northern section is on the Canadian Shield. Like the majority of lakes within the Cataraqui Region, Sydenham Lake mixes in the spring and fall due to lake water warming and cooling. During mixing, nutrients are cycled throughout the lake twice per year and may appear cloudy with a brown or green colour from algae that use the cycled nutrients. Later in the spring, summer, and winter, water temperatures vary by depth (thermal stratification) so multiple fish species are found at different depth and temperature ranges. Eel Bay, the northern basin, is very shallow and does not stratify. Refer to the [Cataraqui Region Lake Assessment Report](#) for more detail.

Water levels are controlled by the Cataraqui Region Conservation Authority at the Sydenham Lake Dam located in the community of Sydenham at the headwaters of Millhaven Creek. Levels are maintained within a 0.3-meter range over the course of the year dependent on rain, snowmelt and weather conditions<sup>1</sup>. Levels are lower in the fall to compensate for expected snow and spring melt. The lake is used as a drinking water source for the community of Sydenham.

## LAKE FEATURES



### **IMPORTANT NATURAL FEATURES:**

Provincially Significant Wetland (north and east end)



### **SURROUNDING LAND USE:**

Woodlands, Wetlands, Agriculture, Trails, Residential (seasonal and permanent)



### **PRIMARY WATER LEVEL CONTROL:**

Cataraqui Region Conservation Authority



### **WATER ACCESS:**

End of Point Road in Sydenham (township), and off of Wilmer Road (CRCA)










# VULNERABILITY

Information about Sydenham Lake has been used to identify whether it is vulnerable to a few common stressors to lake water quality and biodiversity. Stressors include excess nutrient build up (eutrophication), the introduction of invasive species, and pH levels that are too low (acidification). Refer to the scoring card below that grades these risks for Sydenham Lake.

**EUTROPHICATION:** The process of increasing nutrient levels in a waterbody. It results in excess algal growth, lower oxygen levels, and reduced biodiversity. For more information refer to the [Cataraqui Region Lake Assessment Report](#).

-  **Low:** Low nutrient levels (oligotrophic), minimal algae present
-  **Medium:** Moderate nutrient levels (mesotrophic), algae present
-  **High:** High nutrient levels (eutrophic), algae bloom presence likely

**INVASIVE SPECIES:** Species that are not native to an environment, but are introduced, establish, and reproduce in a new system. For more information about invaders in the region, refer to [Appendix 5](#) of the Cataraqui Region Lake Assessment Report.

-  **Absent:** No aquatic invaders reported
-  **Present:** Aquatic invaders established



# VULNERABILITY

**ACIDIFICATION:** The process of lake water becoming more acidic, resulting in reduced biodiversity and increased water clarity.

**Low:** pH 6.5 to >7.5, not impacted, neutral or alkaline conditions

**Medium:** pH 6 to 6.5, sensitive but acceptable range

**High:** pH <6 hyper-sensitive, threatened or critically impaired

## SYDENHAM LAKE VULNERABILITY SCORES

<b>Eutrophication</b>	<b>Invasive Species</b>	<b>Acidification</b>
<b>MEDIUM</b>	<b>PRESENT</b>	<b>LOW</b>

- Based on an average total phosphorus concentration of 0.012 mg/L, nutrient levels are moderate providing for a productive lake with some risk of nuisance algae bloom growth
- Zebra mussels have been reported by Nienhius et al. (2014)<sup>2</sup> and the **Sydenham Lake Association**.
- Sydenham Lake maintains a neutral pH with little risk to acidification



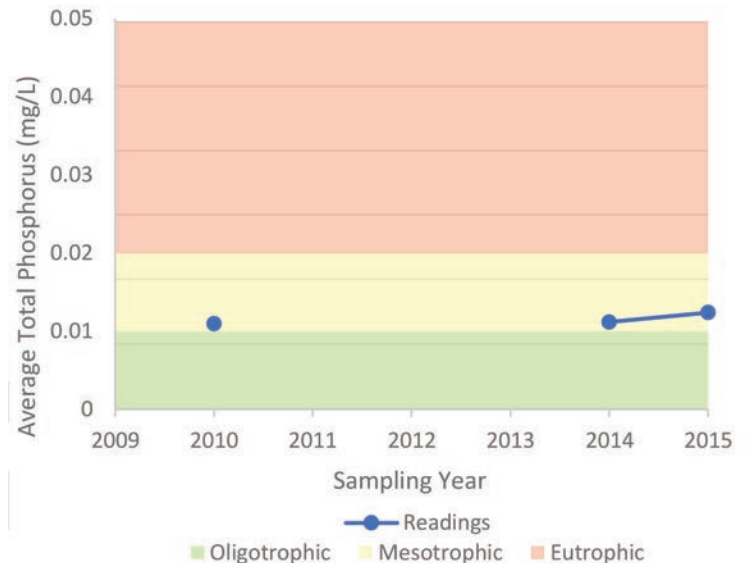


# WATER QUALITY

The water quality of a lake is affected by many factors including temperature, pH, oxygen, nutrients (trophic status), and transparency (Secchi disk depth). Classifying lakes by these factors can provide a better understanding of lake health. For more information, refer to the [Cataraqui Region Lake Assessment Report](#).

## Water Quality Summary

<b>Thermal Regime:</b>	Warmwater
<b>Dissolved Oxygen (mg/l):</b>	7.95 <sup>3</sup>
<b>Trophic Status:</b>	Mesotrophic <sup>4</sup>
<b>Average Secchi Depth (m):</b>	5.70 <sup>3</sup>
<b>Total Phosphorus (mg/l):</b>	0.012 <sup>5</sup>
<b>pH:</b>	8.15 <sup>2</sup>
<b>Average Calcium(mg/l):</b>	37.5 <sup>2</sup>



Sydenham Lake is a warmwater environment hosting a variety of fish species ranging from sunfishes and bass to northern pike. The average phosphorus concentrations suggest the lake is mesotrophic with sufficient nutrients for growth and a lower risk of nuisance algae blooms.

With clear waters, the Secchi disk depth of greater than five meters provides a good environment for site feeding fish like Northern Pike and Largemouth Bass.

Calcium concentrations are high indicating a strong buffering capacity supporting the slightly alkaline pH conditions (refer to [Lake Assessment Report](#)). Nienhius et al. (2014)<sup>2</sup> reported alkalinity concentrations of 122 mg/L calcium carbonate from 2010 also indicating low vulnerability to fluctuations in pH.






Zebra mussels have been reported in Sydenham Lake and populations are being monitored (observational) by the Sydenham Lake Association. Calcium levels within the lake are optimum for zebra and quagga mussels.





# AQUATIC DIVERSITY

Sydenham Lake is a diversity of warmwater and coolwater fish species and is a popular fishing location. The shallow north basin and deep, south basin both provide habitat for common sport fishes. The American Eel, an endangered freshwater fish heavily influenced by dams and changes in water quality, was historically observed in the lake. In 2015, the Ministry of Natural Resources and Forestry observed American Eel in Millhaven Creek during monitoring, indicating nearby suitable habitat for the endangered fish<sup>1</sup>. Fish species previously caught in Sydenham Lake are listed below<sup>8</sup>. There are also a variety of minnows supplementing the food chain along the shallow shoreline areas that have not been recorded<sup>8</sup>.

	<b>COMMON FISH FAMILIES</b>	<b>SPECIES PRESENT</b>
	North American Catfish	Brown Bullhead Yellow Bullhead
	Pikes	Northern Pike
	Sunfishes & Basses	Largemouth Bass Smallmouth Bass Pumpkinseed Bluegill Rock Bass Black Crappie
	Carps & Minnows	Variety
	Perches & Darters	Yellow Perch



# AQUATIC DIVERSITY

FISHERIES MANAGEMENT ZONE

**18**

ACTIVE FISH STOCKING<sup>6</sup>

**NO DATA**

There are some species at risk in the region that will benefit from good lake care practices. At the time of reporting, the following species at risk have been observed within the last ten years<sup>7</sup>:

- Blanding's Turtle
- Eastern Musk Turtle
- Snapping Turtle

Additional species may also be present, but have yet to be reported. It is important to conserve shoreline vegetation and woody debris, and reduce pollution to maintain healthy aquatic communities.



For more information, follow the links below:

[Fish ON-Line  
Reptile and Amphibian Atlas  
Zone 18 Fishing Regulations](#)

[Guide to Eating Ontario Fish  
Species at Risk by Region](#)





NATURAL

ALTERED

# HOW TO PROTECT YOUR LAKE

## Maintain a natural shoreline:

Create a buffer zone by planting native species to control erosion, increase habitat for wildlife, maintain cooler water temperatures (shade), protect from flooding and improve water quality.

Contact [Watersheds Canada](#) to learn more about their [Natural Edge](#) shoreline naturalization program.

## Build low impact-docks:

Increase habitat and reduce sediment disruption. Examples of low impact docks include [cantilever](#), [floating](#) or [post styles](#).

## Reduce runoff from pollutants:

Use phosphate-free, biodegradable soaps and detergents at a distance from the lake and limit or eliminate fertilizers to decrease nutrient input. Limit the amount of hard surfaces to control runoff of pollutants entering the lake.

## Handle and dispose of chemicals properly:

Fuel motor craft responsibly to avoid spills and bring extra chemicals and storage containers to a hazardous waste depots.

## Manage animal waste and grazing areas:

Avoid overgrazing as it can expose soil and increase erosion. Remove animal waste to avoid excess nutrients.

## Maintain your septic system:

Septic systems can last 15-25 years if properly maintained; pump out your septic tank every 3-5 years. Keep septic systems far from the shore to reduce risk of water pollution and limit damage.

## Prevent the spread of invasive species:

Clean, drain, dry and disinfect any watercraft prior to entering the lake. Do not release live fishing bait or aquarium fish.





## Become a citizen scientist:

Citizen science is a great way to learn and engage with nature. Volunteers provide valuable research that allow scientists to track environmental changes to a greater extent than if they were to do it alone. Learn how to get involved by visiting the sites below.

Invading Species Watch Program  
Lake Partner Program  
Loon Watch  
Nature Watch (frog, plant, ice, worm)  
Ontario Reptile & Amphibian Atlas  
Water Rangers

[www.invadingspecies.com](http://www.invadingspecies.com)  
[www.desc.ca](http://www.desc.ca)  
[www.birdscanada.org](http://www.birdscanada.org)  
[www.naturewatch.ca](http://www.naturewatch.ca)  
[www.ontarionature.org](http://www.ontarionature.org)  
[www.waterrangers.ca](http://www.waterrangers.ca)

## To report large blooms of algae:

KFL&A Public Health 1-800-267-7875  
Blue-Green Algae Bloom Sighting (MOECC) 1-800-268-6060

## To report invasive species:

EDD Mapping System App [www.eddmaps.org/ontario](http://www.eddmaps.org/ontario)  
Invasive Species Hotline (OFAH) 1-800-563-7711 or [info@invadingspecies.com](mailto:info@invadingspecies.com)

## For more information:

Cataraqui Region Conservation Authority 1-877-956-2722 or 613-546-4228  
Sydenham Lake Association [www.sydenhamlake.ca/news](http://www.sydenhamlake.ca/news)  
Water Level Questions (CRCA) Contact above

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<sup>1</sup> [Sydenham Lake Association](http://www.sydenhamlake.ca)

<sup>2</sup> Nienhuis, S., Haxton, T.J. and T.C. Dunkley. 2014. An empirical analysis of consequences of zebra mussel invasions on fisheries in inland freshwater lakes in Southern Ontario. *Management of Biological Invasion*. 5:287-302.  
[http://www.reabic.net/journals/mbi/2014/3/MBI\\_2014\\_Nienhuis\\_etal.pdf](http://www.reabic.net/journals/mbi/2014/3/MBI_2014_Nienhuis_etal.pdf)

<sup>3</sup> Data provided by the Broad Scale Monitoring Program (2010)

<sup>4</sup> Data provided by the Broad Scale Monitoring Program (2010), Provincial Water Quality Monitoring Network (2011) and the Lake Partner Program (2015) and PWQO

<sup>5</sup> Data from 2014-2015 provided by the Provincial Water Quality Monitoring Network (2014) and the Lake Partner Program (2015)

<sup>6</sup> Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)

<sup>7</sup> [Ontario Nature Reptile and Amphibian Atlas](http://www.ontarionature.org) and [Fisheries and Oceans Canada \(2016\)](http://www.dfo-mpo.gc.ca)



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