



# LAKE FACT SHEET ( 2017 )

# DEVIL LAKE



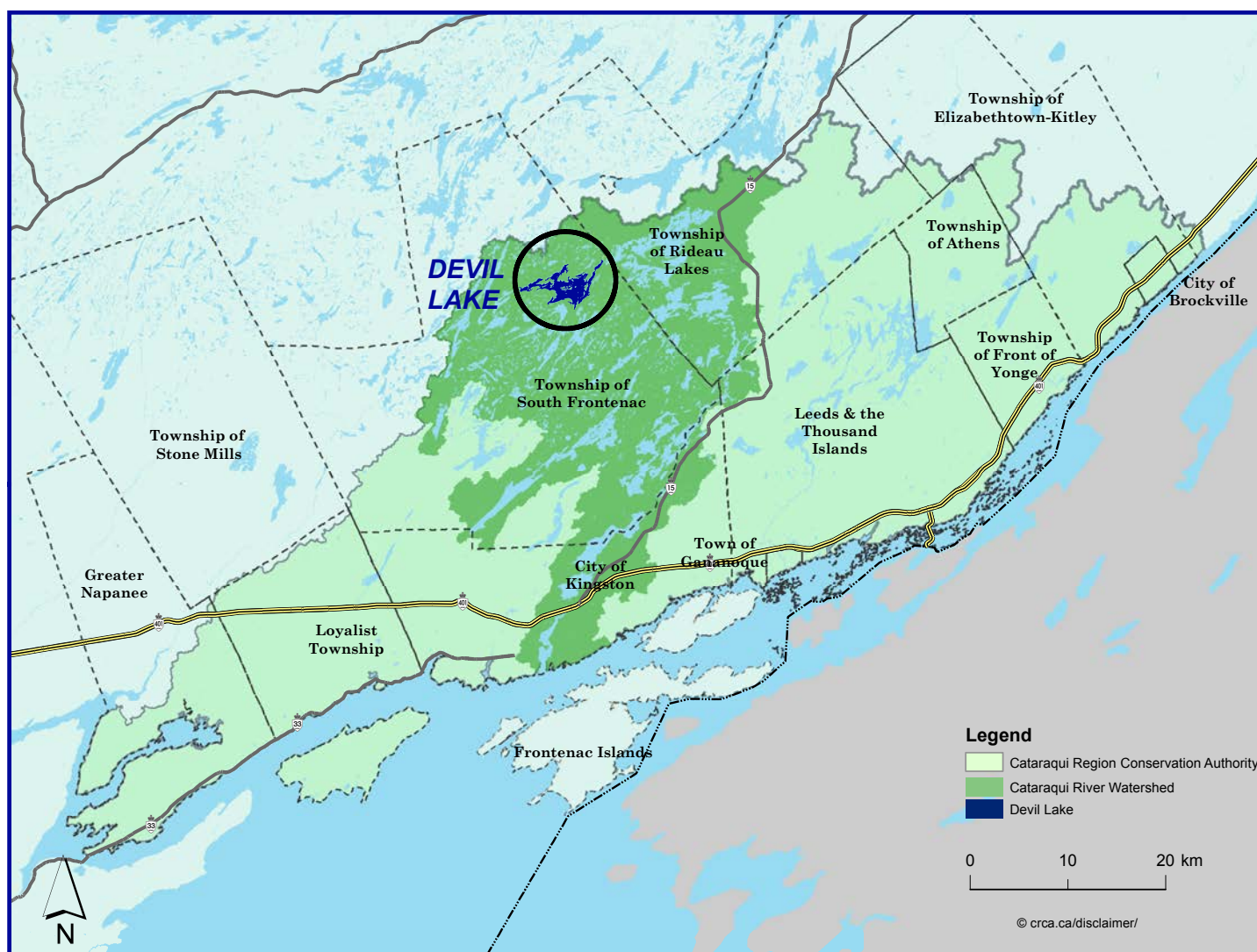
CATARAQUI REGION  
CONSERVATION AUTHORITY



# LAKE FACT SHEETS

The Cataraqui 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 Devil Lake with respect to nutrient loading, invasive species colonization and acidification.

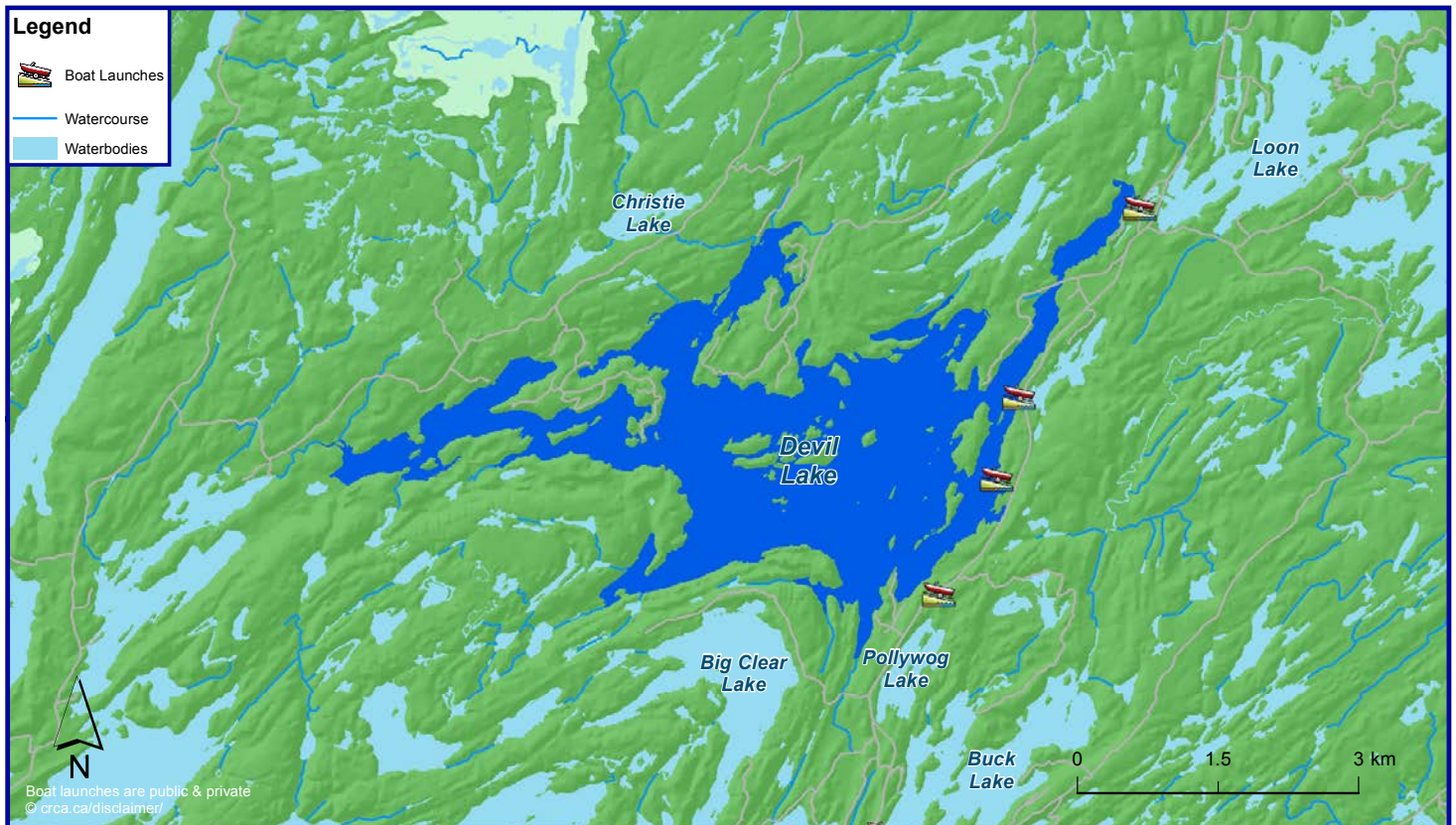






# DEVIL LAKE

Devil Lake is located in the Cataraqui River watershed off Perth Road on the northeast corner of Frontenac Provincial Park. Nearby lakes include Christie Lake, Loon Lake, Big Clear Lake, Pollywog Lake and Buck Lake.



**County:** County of Frontenac

**Municipality:** Township of South Frontenac

**Watershed:** Cataraqui River

**Coordinates:** 44.577 Lat., -76.444 Long.

**Average Depth (m):** 14.35

**Volume (m<sup>3</sup> x10<sup>6</sup>):** 152.4

**SURFACE AREA (HA)**

**1062**

**MAX. DEPTH (M)**

**44.5**

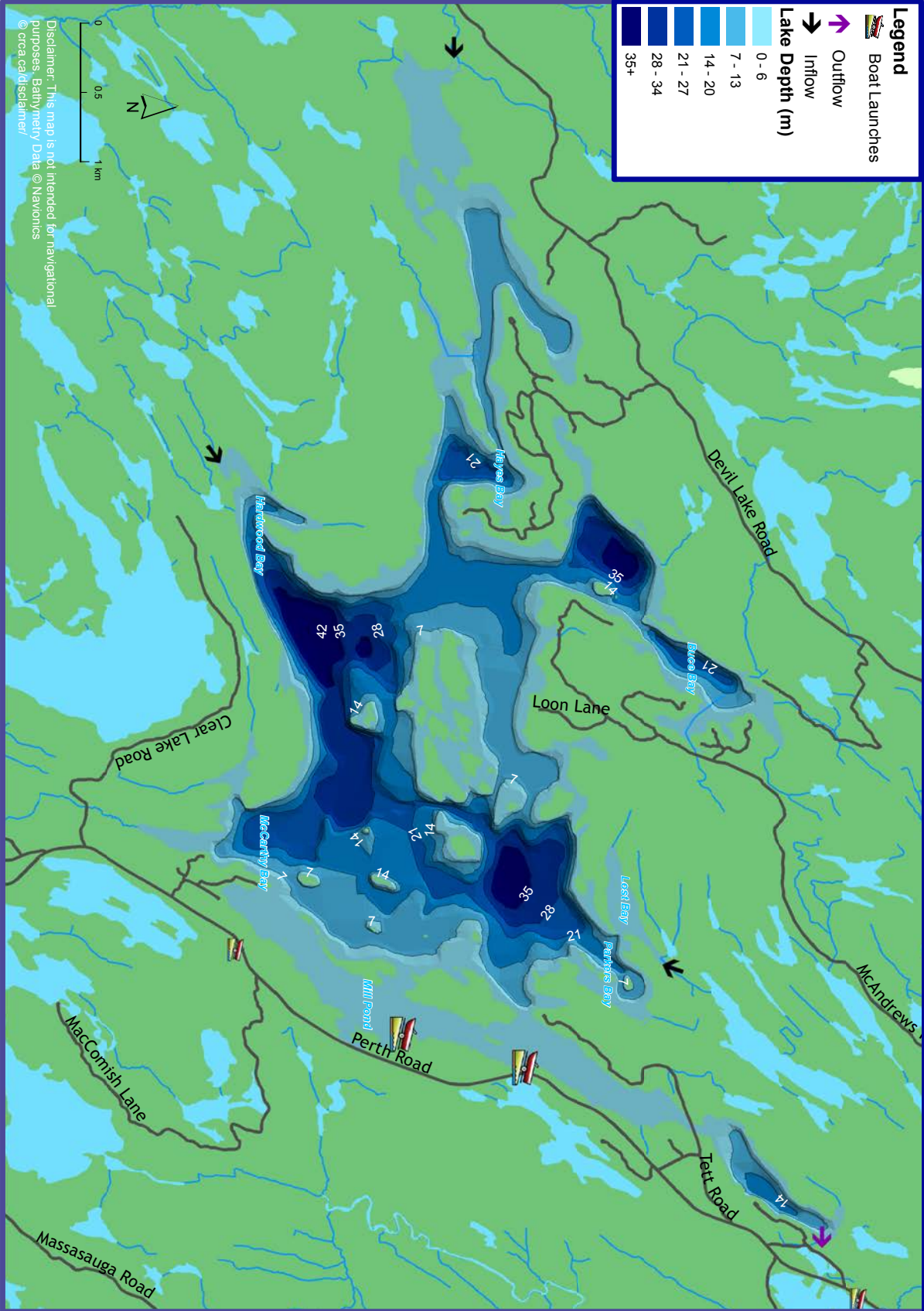
**SHORE LENGTH (KM)**

**57.9**



# LOCATION & BATHYMETRY

The map below shows water depths and the topography of the lake bottom (bathymetry), as well as the direction of water flow. Devil Lake consists of 4 main basins. Water enters Devil Lake from Kingsford Lake, Christie Lake, Crow Lake, and out into Loon Lake via the Brewers Mills dam.







# LAKE CHARACTERISTICS

Devil Lake is a natural, deep, coldwater lake located on the Canadian Shield and enhanced by the construction of a dam. The west end is shallow with wetland areas providing good habitat for bass and pike. As with most lakes within the Cataraqui Region, Devil Lake 'mixes' in the spring and fall due to the lake water warming and cooling. During this mixing process, nutrients are cycled throughout the lake, giving the water a cloudy appearance as well as a brown or green hue from algae that feed off the cycling 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.

There are three dams used to control water levels on Devil Lake owned and operated by Energy Ottawa. Canoe Lake Dam is the uppermost control, followed by Kingsford Lake Dam which regulates water from Knowlton, Holleford, Desert, Birch, and Kingsford Lakes. Lastly the outlet of Devil Lake is controlled by Bedford Mills Dam to maintain the flow entering Loon Lake. Water levels are maintained within 0.5-meters in the winter and late spring, and 1.5-meters during the early spring and late summer due to changes in evaporation rates, precipitation variability, and other climatic factors.

## LAKE FEATURES



### **IMPORTANT NATURAL FEATURES:**

Adjacent to the northeast corner of Frontenac Provincial Park, Areas of Natural and Scientific Interest



### **SURROUNDING LAND USE:**

Woodlands, Wetlands, Residential (year-round and seasonal)



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

Energy Ottawa



### **WATER ACCESS:**




Perth Road (west side), and through the Provincial Park (fee required)





# VULNERABILITY

Information about Devil 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 Devil 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

## DEVIL LAKE VULNERABILITY SCORES

Eutrophication	Invasive Species	Acidification
LOW	PRESENT	LOW

- Based on average total phosphorus concentrations of 0.008 mg/L, nutrient levels are low with no risk of nuisance algae bloom growth
- Zebra mussels have been reported within Devil Lake<sup>1</sup>
- Devil Lake maintains a neutral pH with little risk to acidification



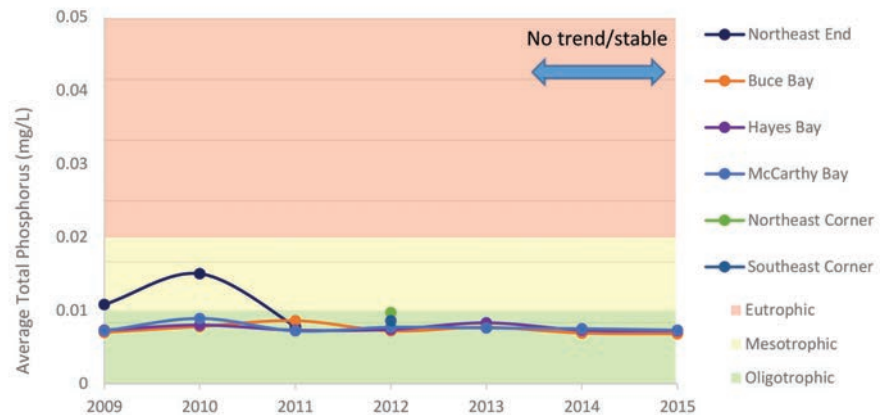


# WATER QUALITY

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

**Thermal Regime:** Coldwater  
**Dissolved Oxygen (mg/l):** No data  
**Trophic Status:** Oligotrophic<sup>2</sup>  
**pH:** No data



Sampling Locations				
	Northeast End	Bruce Bay	Hayes Bay	McCarthy Bay
Trophic Status	Mesotrophic	Oligotrophic	Oligotrophic	Oligotrophic
Average Secchi Disk Depth (m) <sup>3</sup>	5.1	6.9	6.8	6.7
Average Total Phosphorus (mg/L) <sup>4</sup>	0.011	0.0074	0.0075	0.0076
Average Calcium (mg/L) <sup>3</sup>	No data	10.72	11.27	10.87

Devil lake is home to lake trout, a coldwater species with high sensitivity to changes in water conditions. For lake trout to survive, deep pockets with dissolved oxygen of at least seven mg/L is required for young fish growth. Nutrient availability is low in the majority of the lake, however the northeast and southeast corners have moderate conditions. Average Secchi disk depths are high indicating optimal visibility for species requiring vision for predatory behaviours.

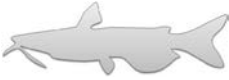

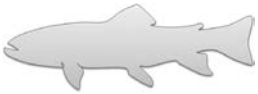

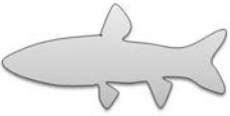

Average calcium concentrations are moderate and at the lowest threshold for zebra mussel establishment. Cohen and Weinstein (2001) observed zebra mussel populations within the lake.





# AQUATIC DIVERSITY

Devil Lake is a highly sensitive lake as it contains coldwater habitat for species such as lake trout. The main threat to trout populations is overfishing and habitat destruction. Fish species previously caught in Devil Lake are listed below. There are also a variety of minnows supplementing the food chain along the shallow shoreline that have not been recorded.

	COMMON FISH FAMILIES	SPECIES PRESENT
	North American Catfish	Brown Bullhead
	Pikes	Northern Pike
	Trout & Salmon	Lake Trout
	Sunfishes & Basses	Largemouth Bass Smallmouth Bass
	Carps & Minnows	Variety
	Perches & Darters	Yellow Perch



# AQUATIC DIVERSITY

FISHERIES MANAGEMENT ZONE

**18**

ACTIVE FISH STOCKING<sup>5</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>6</sup>:

- Blanding's Turtle
- Eastern Musk Turtle
- Northern Map 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](#)





# 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  
Water Level Questions (Energy Ottawa) 613-255-0418 or [info@energyottawa.com](mailto:info@energyottawa.com)

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<sup>1</sup> Cohen, A.H. and A. Weinstein. 2001. Zebra mussels's calcium threshold and implications for its potential distribution in North America. San Francisco Estuary Institute.

[http://www.sfei.org/sites/default/files/biblio\\_files/2001-Zebramusselcalcium356.pdf](http://www.sfei.org/sites/default/files/biblio_files/2001-Zebramusselcalcium356.pdf)

<sup>2</sup> Based on total phosphorus data provided by the Lake Partner Program

<sup>3</sup> Averages provided by the Lake Partner Program (2009-2015)

<sup>4</sup> Data provided by the Lake Partner Program (2012)

<sup>5</sup> Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)

<sup>6</sup> Ontario Nature Reptile and Amphibian Atlas





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