LAKE FACT SHEET (2017)

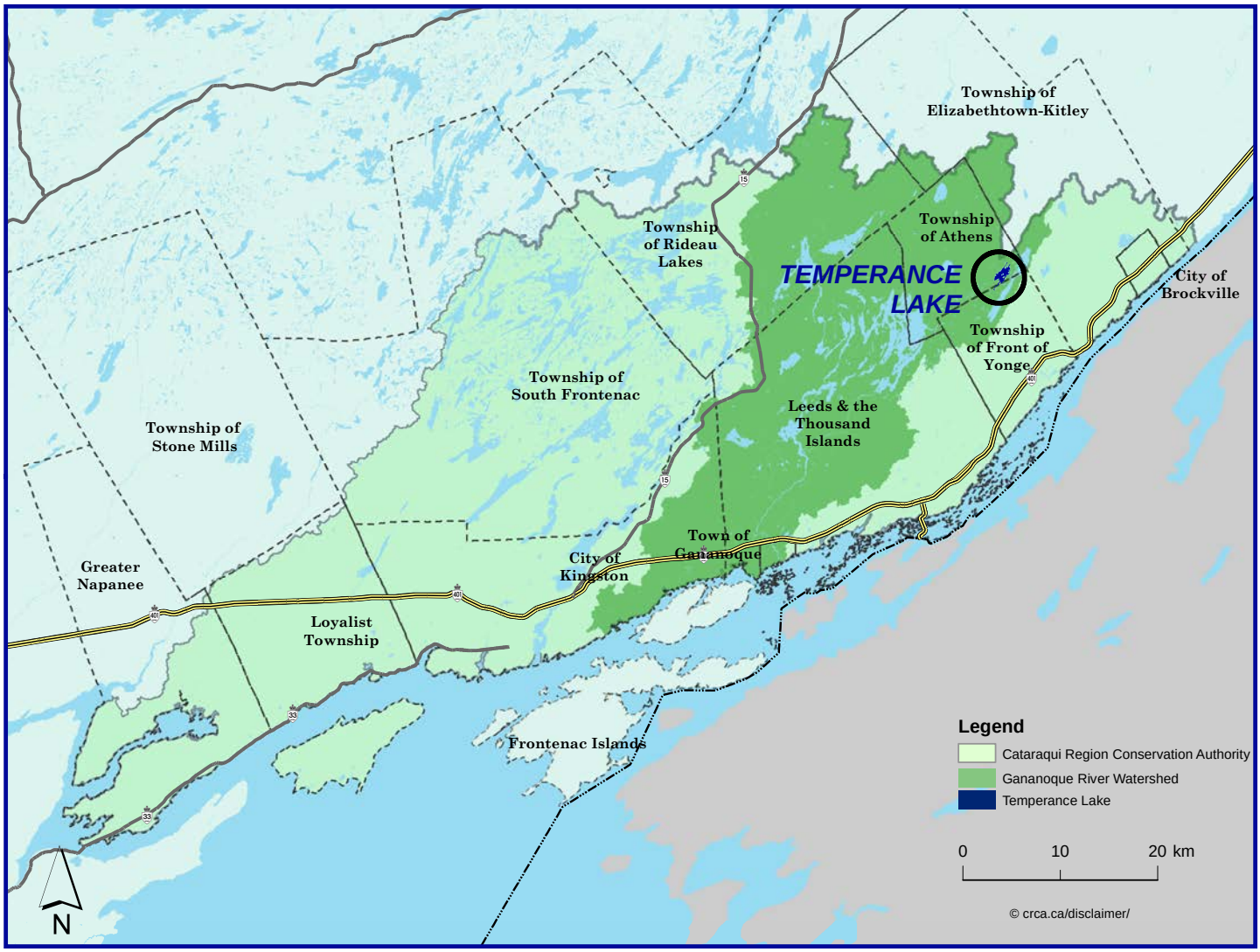
TEMPERANCE LAKE

CATARAQUI REGION
CONSERVATION AUTHORITY

LAKE FACT SHEETS

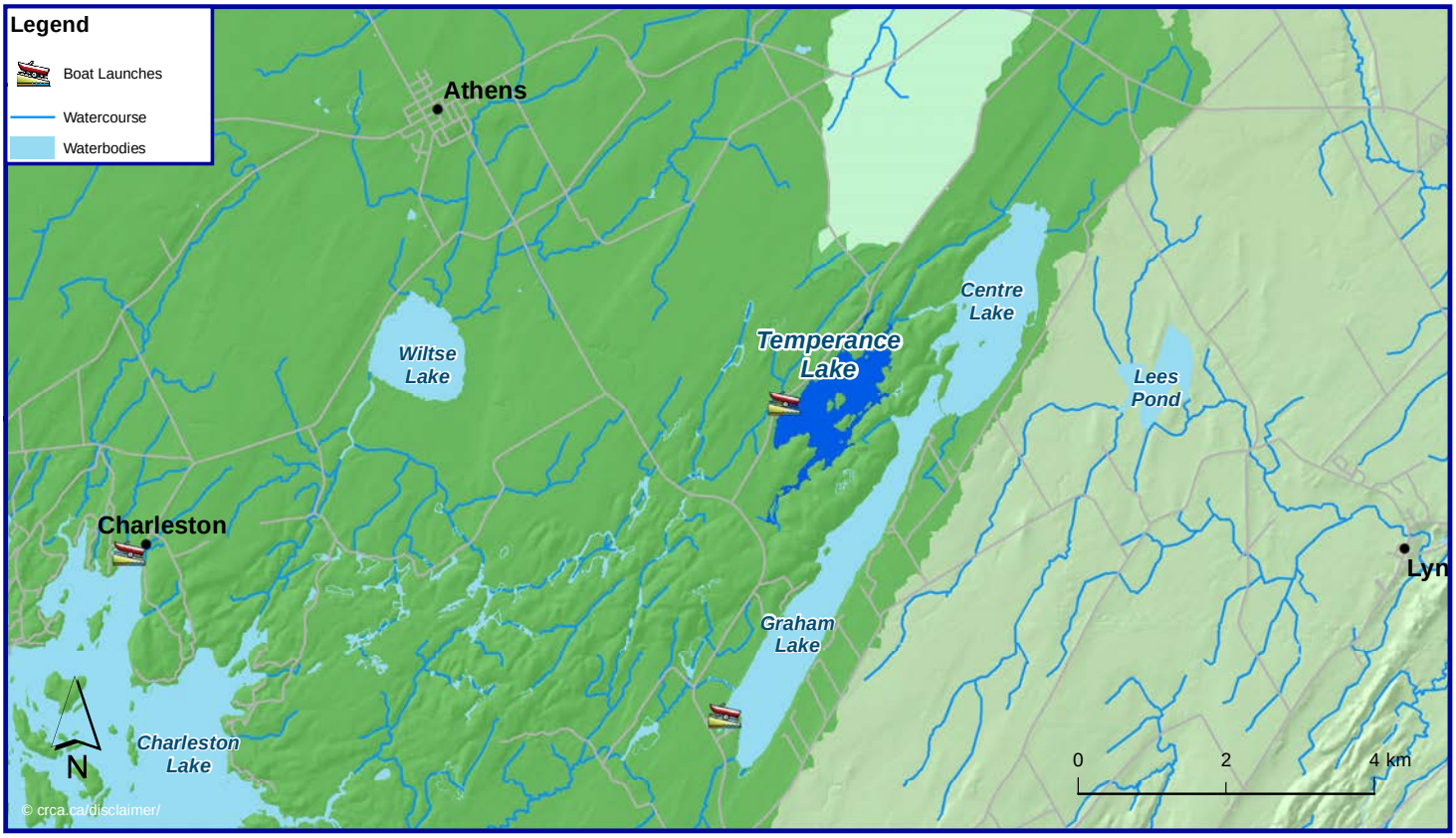
The Cataraqui Region Conservation Authority (CRCA) has provided environmental leadership and service to local communities since 1964. It is one of 36 watershed-based agencies within Ontario dedicated to the conservation and protection of the natural environment through a variety of management tools including 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 Termperance Lake with respect to nutrient loading, invasive species colonization and acidification.



TEMPERANCE LAKE

Temperance Lake is located in the headwaters of the Gananoque River watershed approximately 10km south of Athens via County Road 5. Nearby lakes include Charleston Lake, Wiltse Lake, Centre Lake, Graham Lake and Lees Pond.



County: United Counties Leeds Grenville

Municipality: Township of Athens (small portion of Front of Yonge Township)

Watershed: Gananoque River

Coordinates: 44.584 Lat., -76.562 Long.

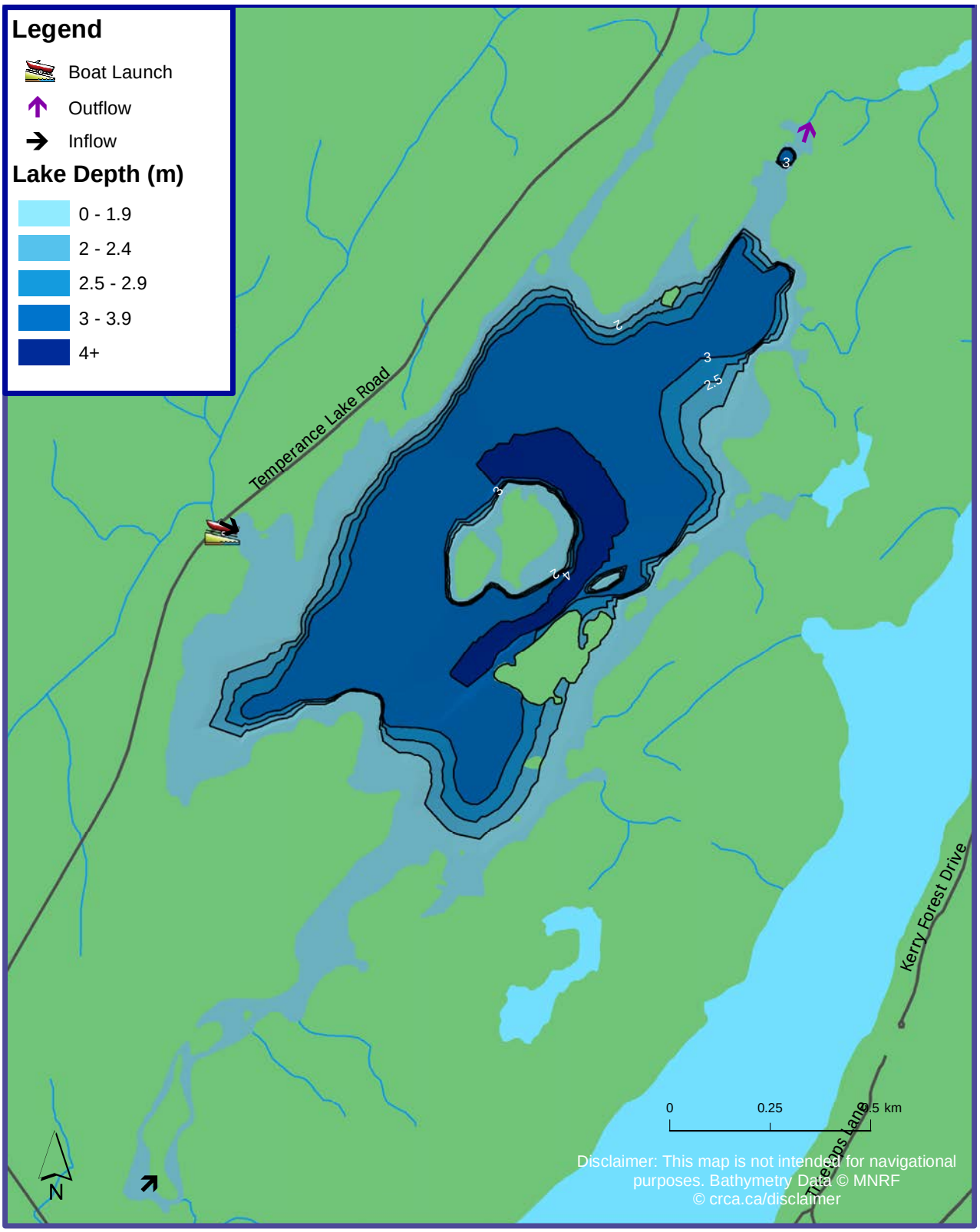
Average Depth (m): 2.7

Volume (m^3 x10^6): 31.3

SURFACE AREA (HA)	MAX. DEPTH (M)	SHORE LENGTH (KM)
118	4.6	11.7

LOCATION & BATHYMETRY

The map below shows water depths and the topography of the lake bottom (bathymetry), as well as the direction of water flow. Temperance Lake is a headwater lakes receiving flow from nearby wetlands to the south. The lake flows out to Centre Lake.



LAKE CHARACTERISTICS

Temperance Lake is a natural, shallow lake underlain by sandstone and enhanced by the construction of a dam. As the sun most likely reaches the bottom sediments, Temperance Lake would likely not stratify during the summer months reducing nutrient mixing within the lake.

Water levels for Temperance Lake are controlled by the Cataraqui Region Conservation Authority at Temperance Lake Dam and are maintained within one-meter of fluctuation throughout the year dependent on evaporation rate, snowmelt, rainfall and climate.

LAKE FEATURES

IMPORTANT NATURAL FEATURES:
None

SURROUNDING LAND USE:
Woodlands, Agriculture, Residential (seasonal and permanent)

PRIMARY WATER LEVEL CONTROL:
Cataraqui Region Conservation Authority

WATER ACCESS:
Off Temperance Lake Road (County Road 5) at north end

VULNERABILITY

Information about Temperance 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 Temperance 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

TEMPERANCE LAKE VULNERABILITY SCORES

Eutrophication	Invasive Species	Acidification
MEDIUM	NO DATA	NO DATA

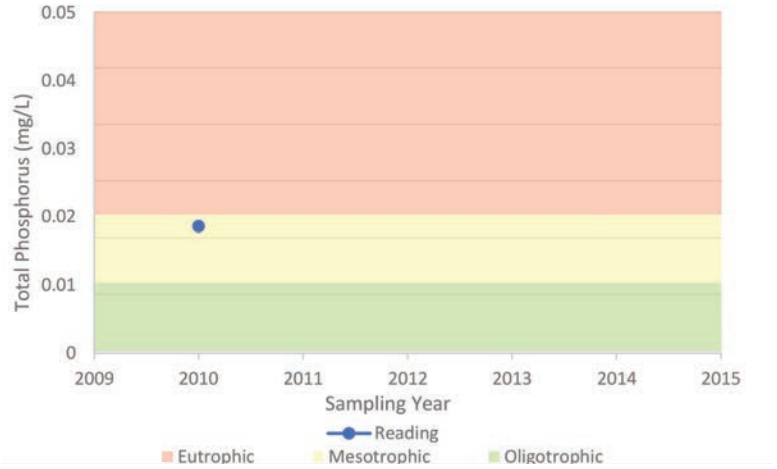
- Based on an average total phosphorus concentration of 0.019 mg/L from 2010, nutrient levels are moderate providing for a productive lake with some risk of nuisance algae bloom growth

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:	Warmwater
Dissolved Oxygen (mg/l):	No data
Trophic Status:	Mesotrophic[1]
Average Secchi Depth (m):	1.5[2]
Total Phosphorus (mg/l):	0.019[2]
pH:	No data
Average Calcium(mg/l):	22.19[2]

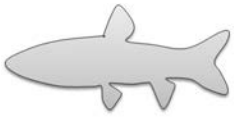


Temperance Lake hosts a warmwater environment and a diversity of common fish species. From 2002-2009, Temperance Lake showed eutrophic conditions based on average total phosphorus concentrations. In 2010, average total phosphorus was at the threshold between moderate and excessive nutrient inputs within the lake, indicating mesotrophic conditions. The Secchi disk depth is below three meters indicating water clarity is very low, and minimal light can enter the lake. Additional monitoring is required to determine whether the nutrient levels are changing.

The Ministry of Natural Resources and Forestry (1989) has predicted that low pH (acidic) conditions are unlikely based on a high buffering capacity due to high carbonate and calcium concentrations within the lake[3]. This means the wide range of species found in Temperance Lake will be protected from the effects of acidification. Average calcium is crucial for the formation of shells and skeletons. Temperance Lake calcium indicates a high concentration suitable for healthy growth and development. This is important as an abundance of algae can often change the pH towards alkaline or acidic conditions. Conditions are favourable to zebra mussels although there are no reported sightings for this lake.

AQUATIC DIVERSITY

Temperance Lake hosts many sport fish, with bass being the most prevalent. Fish species previously caught on Temperance Lake are listed below. There are also a variety of minnows supplementing the food chain along the shallow shoreline areas that have not been recorded.

	COMMON FISH FAMILIES	SPECIES PRESENT
	North American Catfish	Brown Bullhead
	Pikes	Northern Pike
	Suckers	White Sucker
	Sunfishes & Basses	Largemouth Bass Pumpkinseed Rock Bass
	Carps & Minnows	Variety Blackchin Shiner Bluntnose Minnow
	Perches & Darters	Yellow Perch

AQUATIC DIVERSITY

FISHERIES MANAGEMENT ZONE

18

ACTIVE FISH STOCKING[4]

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[5]:

- Blanding's 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	**www.invadingspecies.com**
Lake Partner Program	**www.desc.ca**
Loon Watch	**www.birdscanada.org**
Nature Watch (frog, plant, ice, worm)	**www.naturewatch.ca**
Ontario Reptile & Amphibian Atlas	**www.ontarionature.org**
Water Rangers	**www.waterrangers.ca**

To report large blooms of algae:

Leeds, Grenville & Lanark Health Unit	613-345-5685
Blue-Green Algae Bloom Sighting (MOECC)	1-800-268-6060

To report invasive species:

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

For more information:

Cataraqui Region Conservation Authority	1-877-956-2722 or 613-546-4228
Water Level Questions (CRCA)	Contact above

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[1] Average total phosphorus data provided by the Lake Partner Program and PWQO
[2] Averages provided by the Lake Partner Program
[3] Ministry of Natural Resources and Forestry (1989) **Acid Sensitivity of Lakes in Ontario**
[4] Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)
[5] **Ontario Nature Reptile and Amphibian Atlas**

CATARAQUI REGION CONSERVATION AUTHORITY
1641 Perth Rd. Glenburnie ON K0H 1S0
613-546-4228 | info@crca.ca | crca.ca

Published: 03/17