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 Canoe Lake with respect to nutrient loading, invasive species colonization and acidification.
Canoe Lake is located within the Cataraqui River watershed. Nearby lakes include Garter Lake, Miner Lake, Yankee Lake, Desert Lake, Eel Lake and Devil Lake.

**County:** Frontenac County  
**Municipality:** Township of South Frontenac  
**Watershed:** Cataraqui River  
**Average Depth (m):** 22.9  
**Coordinates:** 44.586 Lat., -76.549 Long.  
**Volume (m$^3 \times 10^6$):** 66.7

<table>
<thead>
<tr>
<th>Surface Area (ha)</th>
<th>Max. Depth (m)</th>
<th>Shore Length (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>291</td>
<td>47.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>
The map below shows water depths and the topography of the lake bottom (bathymetry), as well as the direction of water flow. Water flows into Canoe Lake from Garter Lake, Yankee Lake and Eel Lake, and out into Desert Lake.
Canoe Lake is a natural, deep, coldwater lake on the Canadian Shield enhanced by the construction of a dam. As with most lakes within the Cataraqui Region, Canoe 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. Refer to the Cataraqui Region Lake Assessment Report for more detail.

Water levels fluctuate on Canoe Lake up to three meters. Energy Ottawa is responsible for regulating Canoe Lake levels via the Canoe Lake Dam located at the south end of the lake.

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**LAKE FEATURES**

**IMPORTANT NATURAL FEATURES:**
Provincially Significant Wetland, Area of Natural & Scientific Interest

**SURROUNDING LAND USE:**
Woodlands, Wetlands, Residential (year-round and seasonal)

**PRIMARY WATER LEVEL CONTROL:**
Energy Ottawa Canoe Lake Dam

**WATER ACCESS:**
South end of the lake off James Wilson Road and pay for use at the Canoe Lake Campground (north end)
Information about Canoe 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 Canoe 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
**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

**CANOE LAKE VULNERABILITY SCORES**

<table>
<thead>
<tr>
<th>Eutrophication</th>
<th>Invasive Species</th>
<th>Acidification</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>ABSENT</td>
<td>NO DATA</td>
</tr>
</tbody>
</table>

- Based on average total phosphorus concentration of 0.008 mg/L, nutrient levels are low with no risk of nuisance algae bloom growth
- There have been no reported sightings of successful establishment of aquatic invasive species at Canoe Lake.
Canoe Lake hosts populations of lake trout suggesting coldwater habitats in deeper pools and dissolved oxygen concentrations of at least 7 mg/L to support young fish growth.

Total phosphorus from 2012 indicates that Canoe Lake has low nutrient concentrations. This suggests a high Secchi disk depth greater than 5 meters to allow for increased productivity and high aquatic diversity. Further sampling is required to determine whether there is a trend.

The presence of lake trout infers that pH is within a normal range (i.e. 6.5-8.5). The calcium concentration is high enough to provide a buffer to acidification. There are currently no reports of invasive species establishment.
Canoe Lake is a highly sensitive lake hosting a high diversity of fish ranging from warmwater to coldwater species. As this lake is deep, there are many cold sections providing critical habitat for lake trout. Coldwater species are a good indication of water quality since they have very low tolerance to changes in the aquatic environment. Fish species previously caught on Canoe 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.

<table>
<thead>
<tr>
<th>COMMON FISH FAMILIES</th>
<th>SPECIES PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>North American Catfish</td>
<td>Brown Bullhead</td>
</tr>
<tr>
<td>Pikes</td>
<td>Northern Pike</td>
</tr>
<tr>
<td>Suckers</td>
<td>Longnose Sucker</td>
</tr>
<tr>
<td>Trout &amp; Salmon</td>
<td>Lake Trout</td>
</tr>
<tr>
<td></td>
<td>Cisco</td>
</tr>
<tr>
<td>Sunfishes &amp; Basses</td>
<td>Largemouth Bass</td>
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<tr>
<td></td>
<td>Smallmouth Bass</td>
</tr>
<tr>
<td></td>
<td>Pumpkinseed</td>
</tr>
<tr>
<td></td>
<td>Bluegill</td>
</tr>
<tr>
<td></td>
<td>Rock Bass</td>
</tr>
<tr>
<td>Carps &amp; Minnows</td>
<td>Variety</td>
</tr>
<tr>
<td>Perches &amp; Darters</td>
<td>Yellow Perch</td>
</tr>
<tr>
<td></td>
<td>Logperch</td>
</tr>
</tbody>
</table>
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:

- Blanding’s Turtle
- Eastern Musk Turtle
- Northern Map Turtle
- Snapping Turtle
- Bridle Shiner

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
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

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
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 (Energy Ottawa) 613-225-0418 or info@energyottawa.com

1 Ministry of Natural Resources and Forestry Lake Capacity Summary (2001)
2 Average total phosphorus data provided by the Lake Partner Program (2012)
3 Average Secchi disk depth provided by the Lake Partner Program (2009-2015)
5 Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)
6 Ontario Nature Reptile and Amphibian Atlas and Fisheries and Oceans Canada (2016)