LAKE FACT SHEET (2017)
LOWER ROCK LAKE

CATARAQUI REGION CONSERVATION AUTHORITY
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 Lower Rock Lake with respect to nutrient loading, invasive species colonization and acidification.
Lower Rock Lake is located within the Cataraqui River watershed off Opinicon Road just north of Lower Rock Lake. Nearby lakes include Buck Lake, Poole Lake, Warner Lake, Lake Opinicon, Pothole Lake, Hart Lake, Crow Lake, Loughborough Lake and Traverse Lake.

**County:** County of Frontenac  
**Municipality:** Township of South Frontenac  
**Watershed:** Cataraqui River  
**Average Depth (m):** 6.6  
**Coordinates:** 44.514 Lat., -76.373 Long.  
**Volume (m$^3$ x10$^6$):** 12.89

<table>
<thead>
<tr>
<th>Surface Area (ha)</th>
<th>Max. Depth (m)</th>
<th>Shore Length (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2221</td>
<td>17.4</td>
<td>22.63</td>
</tr>
</tbody>
</table>
The map below shows water depths and the topography of the lake bottom (bathymetry). Water flows into Lower Rock Lake from Upper Rock Lake in the south, and north out to Lake Opinicon.
Lower Rock Lake is a natural, deep lake located on the Canadian Shield. Like many lakes within the Cataraqui Region, Lower Rock Lake mixes in the spring and fall because of the 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. Refer to the Cataraqui Region Lake Assessment Report for more detail.

Water levels are controlled naturally through changes in climate, precipitation, evaporation, and surrounding land use. There may also be an influence from the Chaffey’s Locks water control structure.

**LAKE FEATURES**

**IMPORTANT NATURAL FEATURES:**
None

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

**PRIMARY WATER LEVEL CONTROL:**
Natural

**WATER ACCESS:**
Off Opinicon Road via Rock Lake Creek from Upper Rock Lake (suitable for small water craft only)
Information about Lower Rock 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 Lower Rock 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

**LOWER ROCK LAKE VULNERABILITY SCORES**

<table>
<thead>
<tr>
<th>Eutrophication</th>
<th>Invasive Species</th>
<th>Acidification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOW</strong></td>
<td><strong>ABSENT</strong></td>
<td><strong>LOW</strong></td>
</tr>
</tbody>
</table>

- Based on an average total phosphorus concentration of 0.0076 mg/L, nutrient levels are low with no risk of nuisance algae bloom growth
- There have been no reported sightings of invasive species
- Lower Rock Lake maintains a neutral pH with little risk to acidification
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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Regime:</td>
<td>No data</td>
</tr>
<tr>
<td>Dissolved Oxygen (mg/l):</td>
<td>No data</td>
</tr>
<tr>
<td>Trophic Status:</td>
<td>Oligotrophic¹</td>
</tr>
<tr>
<td>Average Secchi Depth (m):</td>
<td>4.15¹</td>
</tr>
<tr>
<td>Total Phosphorus (mg/l):</td>
<td>0.0076¹</td>
</tr>
<tr>
<td>pH:</td>
<td>8.25¹</td>
</tr>
<tr>
<td>Average Calcium (mg/l):</td>
<td>22.9¹</td>
</tr>
</tbody>
</table>

The single average total phosphorous measurement indicates oligotrophic conditions while the average Secchi disk depth (i.e. less than 5 meters) is indicative of mesotrophic conditions. Additional sampling events are planned for Lower Rock Lake to gain a better understanding of phosphorus and nutrient trends.

Average calcium concentrations and pH indicate the lake is slightly alkaline with a good buffering capacity. As calcium is a high concentration, this lake would be ideal for the establishment of zebra mussels and quagga mussels. There have been no reported sightings as of 2015.

Besides the once sample taken in 2012, there is no available water quality information for Lower Rock Lake. The Cataraqui Region Conservation Authority began collecting samples and taking measurements of this lake in 2016. Analysis of this more recent data will be presented in the next edition of the Lake Assessment Report and this fact sheet.
Lower Rock Lake hosts a diverse aquatic community. Fish species previously caught in Lower Rock 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>Sunfishes &amp; Basses</td>
<td>Largemouth Bass, Smallmouth Bass, Pumpkinseed, Bluegill, Rock Bass, Black Crappie</td>
</tr>
<tr>
<td>Carps &amp; Minnows</td>
<td>Variety</td>
</tr>
<tr>
<td>Perches &amp; Darters</td>
<td>Yellow Perch</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
- 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  

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

1 Data provided by Queen’s University (2012)  
2 Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)  
3 Ontario Nature Reptile and Amphibian Atlas