LAKE FACT SHEET (2017)

GOULD 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 Gould Lake with respect to nutrient loading, invasive species colonization and acidification.
Gould Lake is located in the headwaters of Millhaven Creek watershed about 10km north of Sydenham. Nearby lakes include Knowlton Lake, Deline Lake, Blue Lake, Little Long Lake and Sydenham Lake.

**County:** County of Frontenac  
**Municipality:** Township of South Frontenac  
**Watershed:** Millhaven Creek  
**Average Depth (m):** 18.0  
**Coordinates:** 44.477 Lat., -76.575 Long.  
**Volume (m³ x10⁶):** 39.8

**SURFACE AREA (HA):** 222  
**MAX. DEPTH (M):** 61.6  
**SHORE LENGTH (KM):** 16.9
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 Gould Lake from Blue Lake and surrounding wetlands, and out into Little Long Lake.
Lake Characteristics

Gould Lake is a natural, deep lake located in the Canadian Shield. As with most lakes within the Cataraqui Region, Gould 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 are controlled naturally through changes in climate, precipitation, evaporation, and surrounding land use.

Lake Features

**Important Natural Features:**
Gould Lake Conservation Area

**Surrounding Land Use:**
Woodlands, Residential (year-round and seasonal)

**Primary Water Level Control:**
Natural

**Water Access:**
Only for small un-motorized watercraft through the Conservation Area (fee)
Information about Gould 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 Gould 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

**GOULD LAKE VULNERABILITY SCORES**

- Eutrophication: **LOW**
- Invasive Species: **ABSENT**
- Acidification: **LOW**

- Based on an average total phosphorus concentration of 0.009 mg/L, nutrient levels are low with no risk of nuisance algae bloom growth
- Aquatic invasive species have not been reported in Gould Lake
- Gould 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**

| Thermal Regime: | Coldwater¹ | Total Phosphorus (mg/l): | 0.009⁴ |
| Dissolved Oxygen (mg/l): | No data | pH: | 8.3⁵ |
| Trophic Status: | Oligotrophic² | Average Calcium(mg/l): | 21.7⁵ |
| Average Secchi Depth (m): | 5.75³ |

Gould Lake hosts a sensitive population of lake trout indicating coldwater temperatures are found in the deep basins of the lake with dissolved oxygen concentrations of at least seven mg/L to sustain young fish growth.

Prior to 2009, Gould Lake was classified as mesotrophic based on average total phosphorus and Secchi disk depths provided by the Lake Partner Program. The lake has since improved with a Secchi reading of greater than five meters and oligotrophic trophic status.

Average calcium concentrations are high indicating a strong buffering capacity supporting the slightly alkaline pH conditions. As calcium levels are above 12 mg/L, Gould Lake has ideal conditions to support invasive mussels. There have been no reported sightings of invasive species within this lake, however, education on cleaning practices for boating transportation should be continued to prevent any future introductions.
Gould Lake is a sensitive lake hosting a diversity of fish species. As this lake is deep, there are many cold sections providing critical habitat for lake trout. When coldwater species such as trout are present, this is a good indication of water quality since these species are highly sensitive to specific habitat conditions. Fish species previously caught on Gould 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. There is a Lake Trout Fishery located on Gould Lake.

<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>Sunfishes &amp; Basses</td>
<td>Largemouth Bass</td>
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<tr>
<td></td>
<td>Pumpkinseed</td>
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<tr>
<td></td>
<td>Bluegill</td>
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<tr>
<td></td>
<td>Rock Bass</td>
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<tr>
<td>Trout &amp; Salmon</td>
<td>Lake Whitefish</td>
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<tr>
<td></td>
<td>Lake Trout</td>
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<tr>
<td></td>
<td>Splake</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>
Aquatic Diversity

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

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: [www.invadingspecies.com](http://www.invadingspecies.com)
- Lake Partner Program: [www.desc.ca](http://www.desc.ca)
- Loon Watch: [www.birdscanada.org](http://www.birdscanada.org)
- Nature Watch (frog, plant, ice, worm): [www.naturewatch.ca](http://www.naturewatch.ca)
- Ontario Reptile & Amphibian Atlas: [www.ontarionature.org](http://www.ontarionature.org)
- Water Rangers: [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

For more information:
- Cataraqui Region Conservation Authority: 1-877-956-2722 or 613-546-4228

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1 Ministry of Natural Resources and Forestry Lake Capacity Summary (2001)
2 Average total phosphorus data provided by the Lake Partner Program
3 Average Secchi Disk depth provided by Queen’s University (2013)
4 Data provided by the Lake Partner Program (2012-2013)
5 Data provided by Queen’s University (2013)
6 Ministry of Natural Resources and Forestry Fisheries Data (Fish ON-line and personal communication, 2016)
7 [Ontario Nature Reptile and Amphibian Atlas](http://www.ontarioreptileandamphibian.ca)