

2023 SECCHI DIP-IN

BC LAKE STEWARDSHIP SOCIETY



Jade Lake by Marie McCallum

Acknowledgments

Thank you to the North American Lake Management Society for organizing and managing the data for the Secchi Dip-In.

Thanks to a generous donation from Tru Earth, we were able to provide 30 of our participants with a 32 pack of eco-laundry strips.

Thank you to the volunteers who submitted to the BC Secchi Dip-In in 2023.



North American Lake Management Society



BCLSS

Background

The Secchi Dip-In is a program of the North American Lake Management Society (NALMS). The mission of the Society is to forge partnerships among citizens, scientists, and professionals to foster the management and protection of lakes and reservoirs for today and tomorrow (NALMS, 2023). The Secchi Dip-In began in 1994 to demonstrate that volunteers can provide accurate, consistent information for lakes. As of the latest Dip-In report (2021), the total number of Secchi depth measurements submitted from 2016 to 2020 ranged from 1761 (2016) to 1936 (2017). Since NALMS took over the Secchi Dip-In, there has been an annual increase in the total number of participants, peaking in 2018 with a total of 2205 participants (Hicks, 2021).

The Secchi Dip-In program is an ongoing effort to have volunteers gather water quality data on an annual basis, particularly in July. Secchi Dip-In participants include trained monitoring volunteers, individuals interested in volunteer-based science efforts, and lake enthusiasts (Snyder, 2017).

The History of the Secchi Disk

Pietro Angelo Secchi, an astrophysicist and scientific advisor to the Pope, created the Secchi disk in 1865, when he was asked to measure the clearness of the water in the Mediterranean Sea. Secchi created a white disk attached to a line, which he lowered into the water and recorded its depth. He continued “dipping” from season to season and year to year and compared his readings over time. Since then, various sizes of disks have been used, with the most common being an 8-inch diameter plastic disk with black and white quadrants.

How is the Secchi Disk Used?

The process is simple: using the attached line or tape measure, lower the Secchi disk into the water until it is just out of sight. Record this depth using the increments on the line or tape measure. Now, raise the disk slightly until you can just see it and record this depth. The average of the two depths is your Secchi disk reading.

British Columbia’s Dip-In Participation

Since 2002, the BC Lake Stewardship Society has coordinated BC’s participation in the North America-wide annual Secchi Dip-In. This year (2023), 70 dips were done on 48 lakes which is the same number of dips, but a decrease in 5 lakes from 2022. We had several volunteers that submitted multiple dips for their lake and the average was taken of those measurements. One dip was outside of the timeframe of the Dip-In, which takes place in the month of July. While there were less lakes sampled this year, the total number of dips stayed the same. The BCLSS would like to continue increasing the number of Dip-In readings because these annual snapshots can be put together to form a changing picture of transparency over time (NALMS, 2023).



Temperature and pH

This year, temperature readings were included with 93% of Secchi depth readings. We also received pH readings for 20 lakes.

The coldest reading was from NK'Pux Lake (Thompson Nicola region) at 15.6°C and the warmest reading was 27.0°C at Fork Lake (Vancouver Island region).

Secchi Readings

The deepest Secchi reading was recorded at Gun Lake (Chilcotin region) with a record breaking 24.10 m. The second deepest Secchi depth measured was Pavilion Lake (Thompson-Nicola region) at 18.53 m. The shallowest reading was at Somenos Lake (Vancouver Island region) at 0.72 m. The second shallowest reading was at Williams Lake (Cariboo region) at 0.75 m. Figure 1 shows all Secchi depth readings submitted to the BCLSS in 2023.

What Does the Secchi Disk Tell Us?

The Secchi disk gives us a reading of water transparency according to the depth of the measurement. The volume of suspended particles contained in the lake water affects transparency. These suspended particles can be a combination of things such as zooplankton, algae, pollutants, and silt. Comprehensive Secchi data collected year after year can provide valuable information on trends in transparency for monitored lakes. Every lake is different in size, shape, depth, and geography, and each has its own combination of particles. Each Secchi reading provides a “snapshot” of the water quality in the lake at that particular time.

What Can Cause Changes in the Secchi Reading?

Readings that show a trend of **decreasing** depth for a lake during the Dip-In (in the summer) may be the result of one or more of the following factors:

- i. Environmental variability associated with annual climatic variation
- ii. Higher nutrient levels which can increase algal growth
- iii. Erosion of the shoreline or erosion from site development near the lake
- iv. Recirculation of bottom sediment from motorboat activity
- v. Discolouration of the water from wetland runoff and/or plant decomposition
- vi. Reduced zooplankton populations

Additionally, most lakes will experience increased boat activity on weekends and holidays. Taking a Secchi reading on the day after a weekend or holiday may show different results than a reading taken at a different time of the week. This can reveal the effect increased boat activity has on the transparency of a lake. Significant storm events, storm water runoff, and turnover can also alter Secchi readings.

Readings that show a trend of **increasing** depth can be the result of one or more of the following:

- i. Environmental variability associated with annual climatic variation
- ii. Low nutrient levels, which can decrease algal growth (lower productivity of the lake)
- iii. Little or no mixing of the lake water (sediments settle to the bottom)
- iv. The effects over time of shoreline restoration – clarity may increase if shoreline enhancement projects have been accomplished and consequently erosion and/or pollution sources have decreased
- v. Increased zooplankton populations

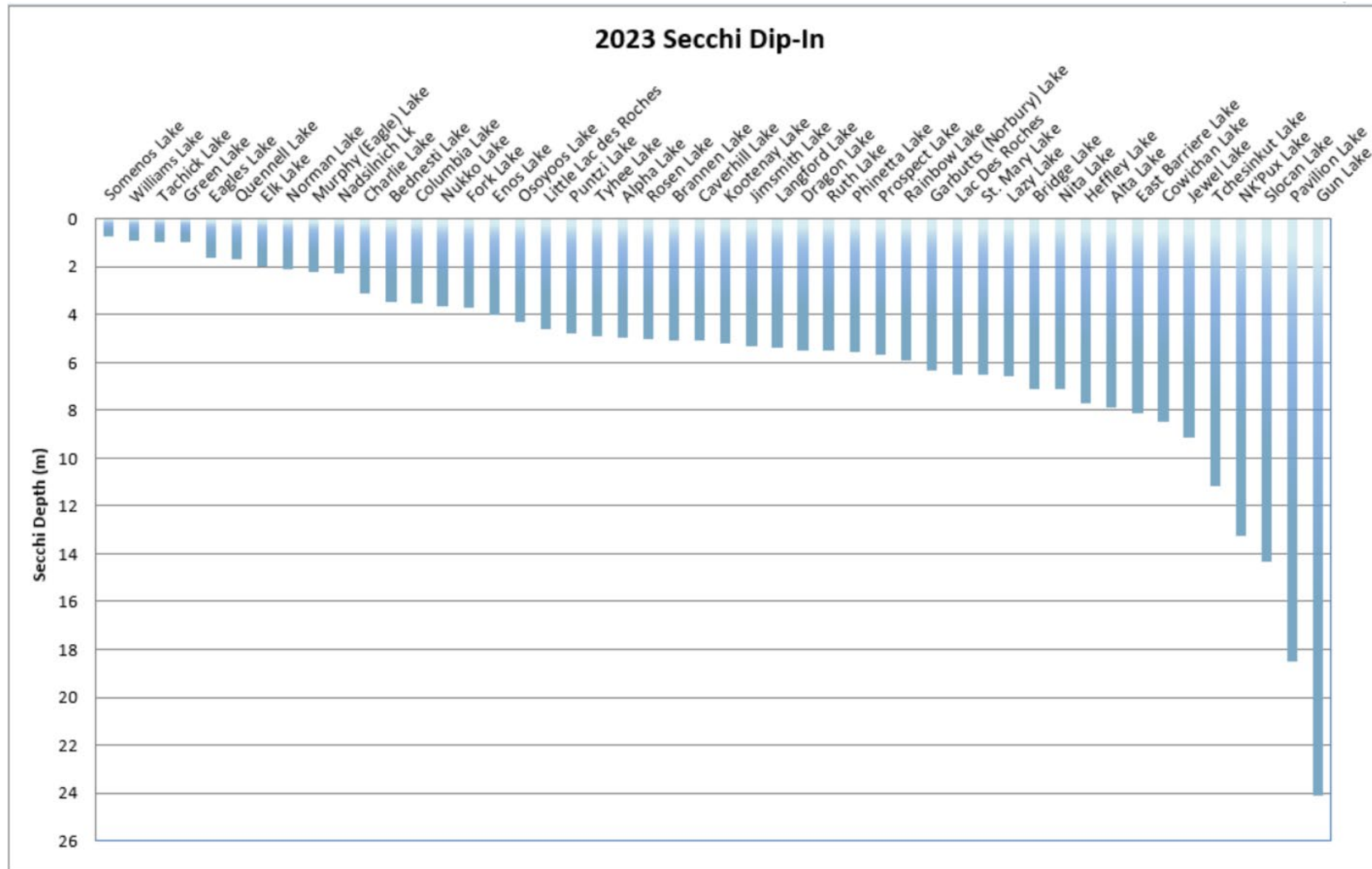


Figure 1. Secchi depths for BC lakes from the 2023 Secchi Dip-In. Graph shows average Secchi depth when more than one measurement was submitted for a lake during the dip-in period.

Algae Watch

The BC Ministry of Environment and Climate Change Strategy (ENV) has developed the Algae Watch Program, which is a citizen science program where volunteers can submit algae observations online. Worldwide, the occurrence and severity of algal blooms are expected to increase in frequency and duration as a result of increased nutrient loading and climate change (Janssen et al., 2019). The program allows the Ministry to better understand cyanobacteria and algae blooms in B.C. For more information or if you see an algae bloom out on a lake in B.C., visit the [Algae Watch](#) website and [submit your observation](#).

Become a Dipper!

Please encourage others to take part in the 2024 Secchi Dip-In. If Secchi depth is measured in a lake routinely for many consecutive years, the data can be analyzed for trends in water clarity. This could be valuable for examining the effects of climate change.

Last year, the North American Lake Management Society introduced a new Secchi Dip-In database via the AWQMS public portal. This portal allows you to view publicly available Dip-In data and includes historical information for BC lakes that have participated in the Dip-In. If you would like to explore the data and associated graphs, you can go to <https://www.nalms.org/secchidipin/explore-the-data/>.

To become a dipper for the 2024 Secchi Dip-In, please contact the BCLSS office. An email reminder with instructions and data sheets will be sent out in the spring. The best way to receive updates is to subscribe to our monthly newsletter. A **FREE** Secchi disk is provided to every individual or group that commits to a monitoring program under the BC Lake Stewardship and Monitoring Program.



Photo Credit

Title page: Jade Lake by Marie McCallum

Page 2: Alpha Lake by Marie McCallum

Page 5: Alta Lake by Marie McCallum

References

North American Lake Management Society (NALMS). 2023. www.nalms.org

Hicks, L. 2021. *The 2017 – 2020 Secchi Dip-In Report*. North American Lake Management Society. Accessed August 29, 2023. https://www.nalms.org/wp-content/uploads/2022/06/2021-Secchi-Dip-In-Report_Final.pdf

Janssen, A. B., Janse, J. H., Beusen, A. H., Chang, M., Harrison, J. A., Huttunen, I., Kong, X., Rost, J., Teurlinx, S., Troost, T. A., van Wijk, D., & Mooij, W. M. (2019). How to model algal blooms in any lake on earth. *Current opinion in environmental sustainability*, 36, 1-10.

<https://www.sciencedirect.com/science/article/pii/S187734351830037X>