SSEA Update on Farlain Lake Water Levels at May 2023
Aisha Chiandet, Water Scientist/Limnologist

Farlain Lake is a kettle lake with no surface outflow. This lack of outflow makes lake water levels more sensitive to changes in precipitation. In recent years, high water levels have caused damage to shoreline vegetation, structures such as docks and boathouses, and in a small number of cases, wells or septic systems have been compromised.

In 2019, the Severn Sound Environmental Association (SSEA), in partnership with the Township of Tiny and Farlain Lake Community Association (FLCA) installed a water level gauge at the south end of the Andrew Dr. boat launch. Since that time, volunteers have submitted water level readings during the ice-free period through SSEA's Water Level Watch citizen science program. A volunteer also maintains a water level gauge on the lake, and measurements from this gauge are used to fill in data gaps from the boat launch gauge. The table below shows minimum, average, and maximum water levels from 2019-2022.

Table 1. Minimum, average, and maximum water levels (cm) measured at the gauges at the Andrew Dr boat launch, and a volunteer's property from 2019-2022.

	Minimum	Average	Maximum	# of Readings
2019	18.0	32.5	59.7	57
2020	9.5	28.4	47.7	42
2021	7	19.7	34	15
2022	22	37.7	50	50

Seasonal Patterns
Levels in spring and early summer of 2022 were lower than the highest levels in 2019, however beginning in August, levels rose slightly and were slow to drop in the fall. By the end of the season, they were closer to 2019 levels going into the winter season. The graph below shows the pattern of water level rise and fall through the seasons from 2019-2022, with spring 2023 data included.
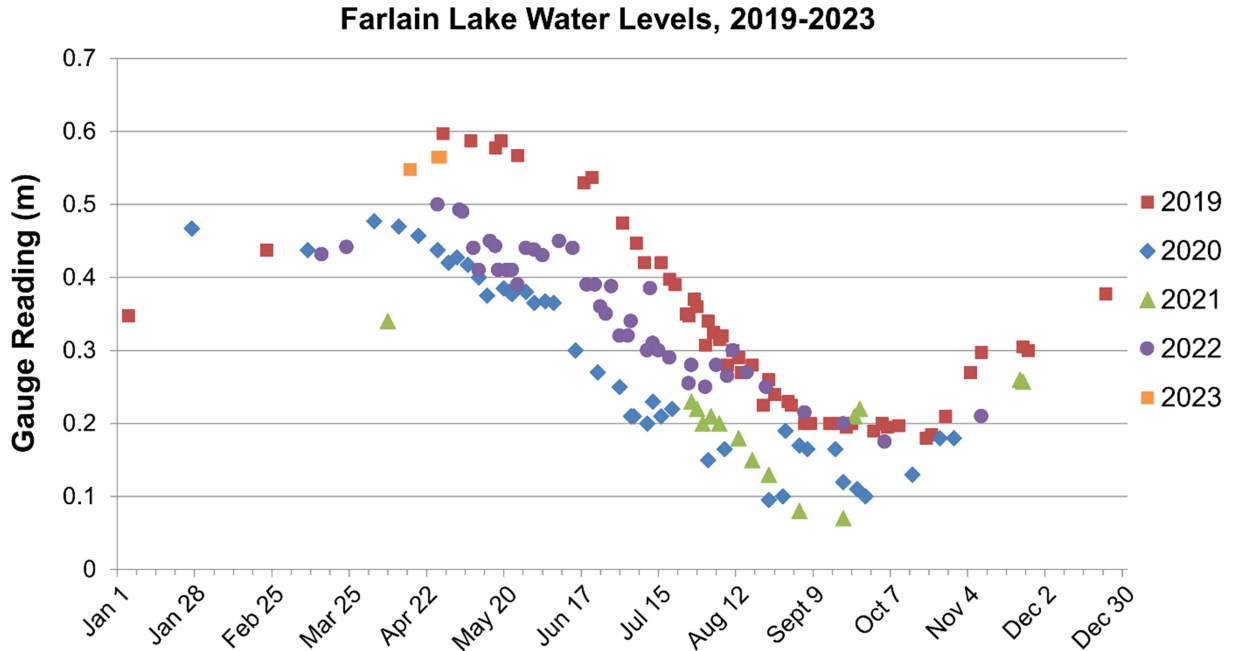
Farlain Lake Water Levels, 2019-2023

Figure 1. Water levels for 2019 – 2022, in addition to spring 2023 data, from the boat launch gauge and volunteer private property gauge.

Impacts of Rainfall
Analysis of rainfall and water levels showed that a noticeable change in water level occurs (approx. 1-14 cm) in response to rain events ranging from 14-106 mm, with a lag time of one to five days. This indicates that levels are quite responsive to short term changes in precipitation and this strong relationship can be seen in the graph below.
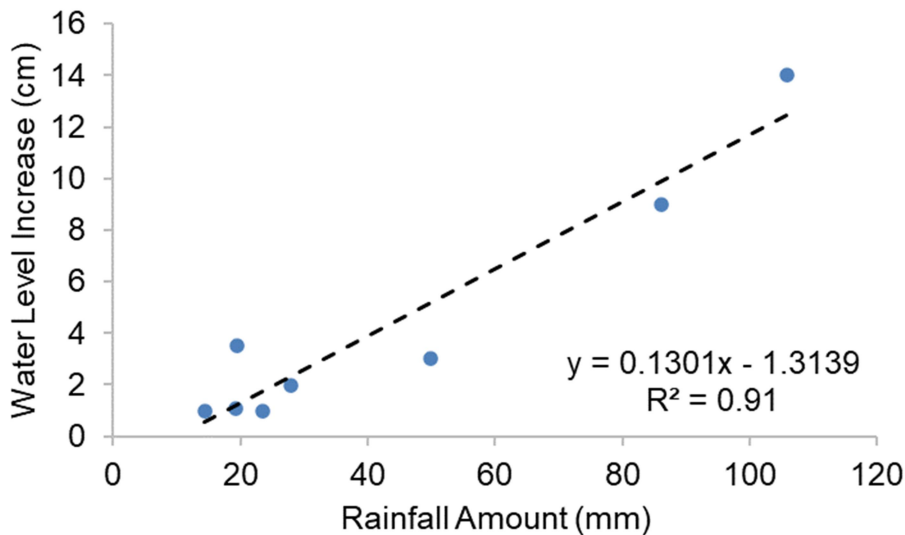

$y = 0.1301x - 1.3139$
$R^2 = 0.91$

Figure 2. Rainfall amount is shown on the X axis with the corresponding increase in water levels on the Y axis. The closer the R^2 value is to 1, the tighter the relationship is.

Climate change may cause more variability in the amount and intensity of precipitation, likely making water levels more variable in the future. Residents should take steps to make their shorelines more resilient to high water and erosion, and capture rainfall and promote slow infiltration of precipitation into the ground where possible.

The graph below shows water levels plotted over time, along with rainfall from the nearest SSEA rain gauge in Penetanguishene.
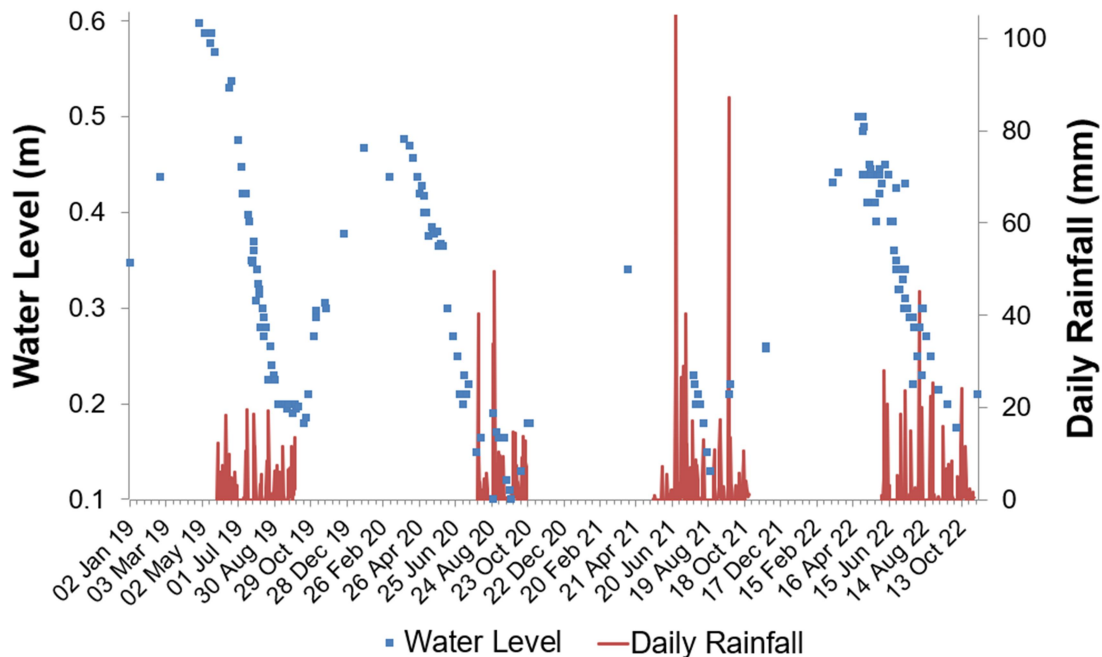

Figure 3. Water levels (blue squares) and daily rainfall (red bars) for 2019 - 2022. Note that rainfall is normally recorded from May-Oct with the SSEA gauge, however in 2020, installation was significantly delayed due to COVID-19.

2023 Conditions and Seasonal Outlook
Based on measurements recorded so far this spring, water levels are 6.5 cm higher compared to the same time last year, but 3.5 cm lower than the highest levels recorded in 2019. So far, the highest reading in 2023 has been 56.5 cm. Based on patterns from previous years, the peak for the season has likely already occurred and levels will begin to drop. The Environment and Climate Change Canada three-month precipitation forecast indicates an essentially equal chance that rainfall levels will be above, below or near normal. Given the difficulty in accurately forecasting rainfall for the summer/fall, it's not possible to accurately predict water levels for the rest of the season. However, if rainfall amounts are within the range of previous years, it is likely that water levels will remain below 2019 levels while remaining higher than last year.

Continued monitoring of water levels and precipitation will build a dataset that will:
- provide a better understanding of seasonal patterns and sensitivity to rain events

- enable some degree of forecasting of summer water levels based on spring values and the Environment and Climate Change Canada forecast
- allow further exploration into how lake levels are influenced by climate factors

Key Actions Residents Can Take
- Join our Water Level Watch program! Email citizenscience@severnsound.ca to sign up. The more volunteers we have, the more data we can gather!
- Maximize the amount of precipitation that can soak into the ground on your property instead of running right into the lake by reducing paved surfaces, using rain barrels, and installing rain gardens.
- When installing or replacing docks, use floating systems that can be adjusted if water levels rise or drop.
- Have your septic system pumped out and inspected every 3-5 years and watch for signs of a failing system (bad smell, wet areas, green patches around tile field).
- Reduce shoreline erosion by reducing your boat wake near shore, especially during times of higher water.
- Increase shoreline resilience and reduce erosion by maintaining a natural shoreline. Plant native trees, shrubs and other plants that are suited to shoreline habitats and can withstand changes in water levels.

Thank you to all the volunteers who have submitted water level measurements over the years!

Water Level Watch

This program is supported by: