Chandos Lake Low Water Occurrence 2025

2025 was a very exceptional year for Chandos Lake with the achievement of a low water mark not seen in several decades.

Figure 1 exposed rocks (I. Gorman)

Figure 2 mud flat at beach (GRA)

Some comparison data for previous summer lake levels

3rd Quarter monthly water levels for this year (2025), the previous year (2024), a recent high-water year (2021), along with a historical year (1960) are given in the graph below. *(The 1960 data is taken from a1961 Crowe Valley Conservation Report)*

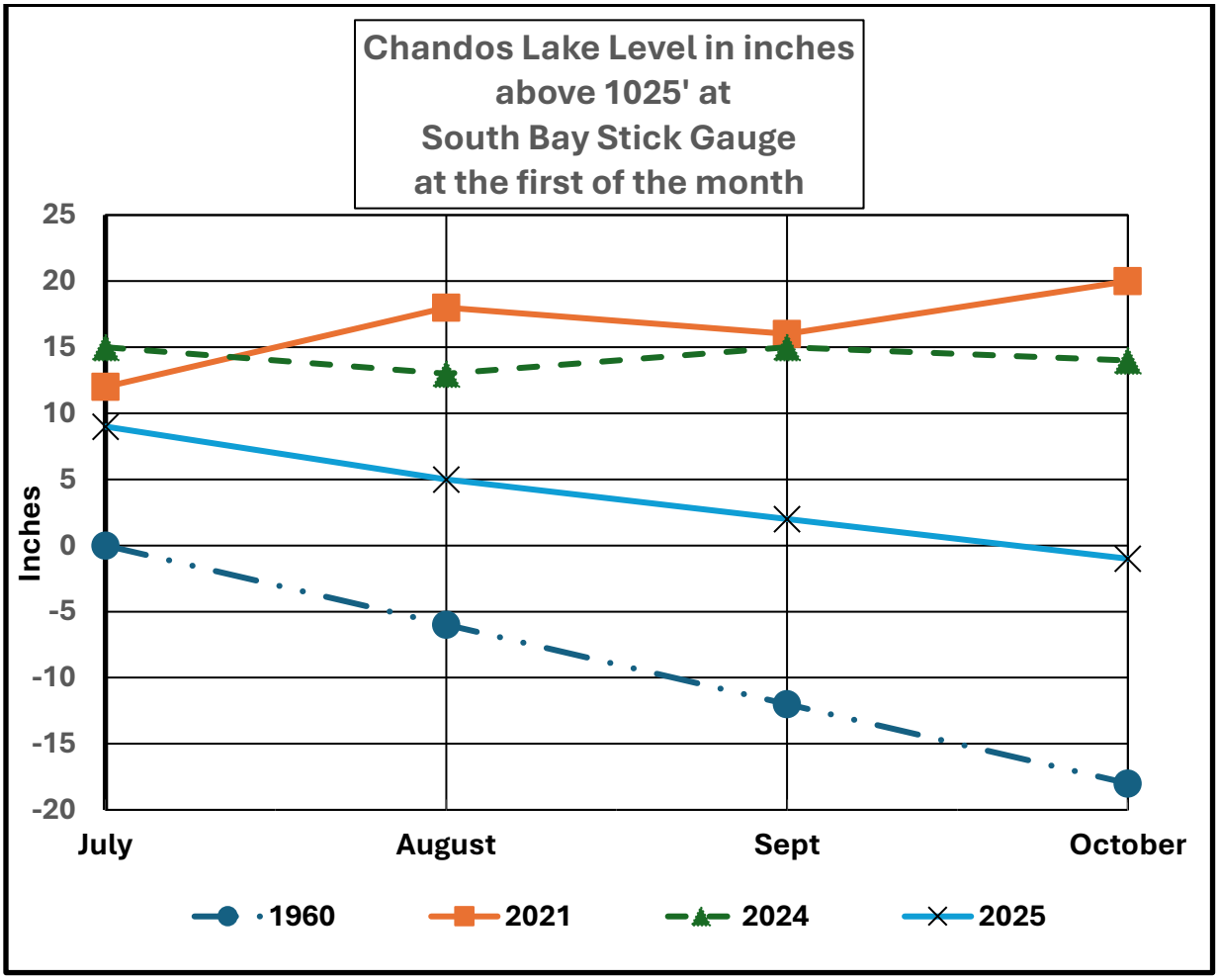


Figure 3 Chandos Lake Levels 2021-25

As can be seen, the 2025 end of season (October 1) lake level is down a full 15 inches from 2024. And it is down a full 21 inches from a recent high-water level recorded in 2021. The historical 1960 data show a significantly lower level, but this was from the time before the twin

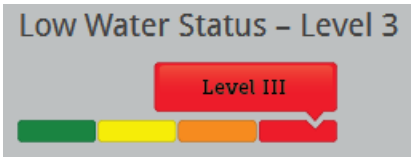
culverts were installed. Since then, it is believed that the culverts have gradually silted up, thus causing a gradual rise in the lake level over the intervening years.

Figure 4 A 5-foot pole being inserted about 4' into the silt. (2019 – West Culvert GRA)

In September of 2025 the Crowe Valley Conservation Authority Low Water Response Team declared a **Level III Low Water Condition**.

(https://www.crowevalley.com/wp-content/uploads/Media-Release-September-2025_LWR_3.pdf)

"A Level 3 low water condition is declared when a watershed receives only 40% or less of the normal amount of precipitation over a 3-month period or if streamflow reaches 30% or less of the average over a 1-month period. Level 3 is the highest of three levels, and indicates a potential failure of water supply to meet the demand."



Level 3 indicates that the CVCA is encouraging reduction in water use and that various municipalities may implement by-laws to restrict water use.

Figure 5 this guy can now stand on the bottom! (I. Gorman)

The Water Cycle

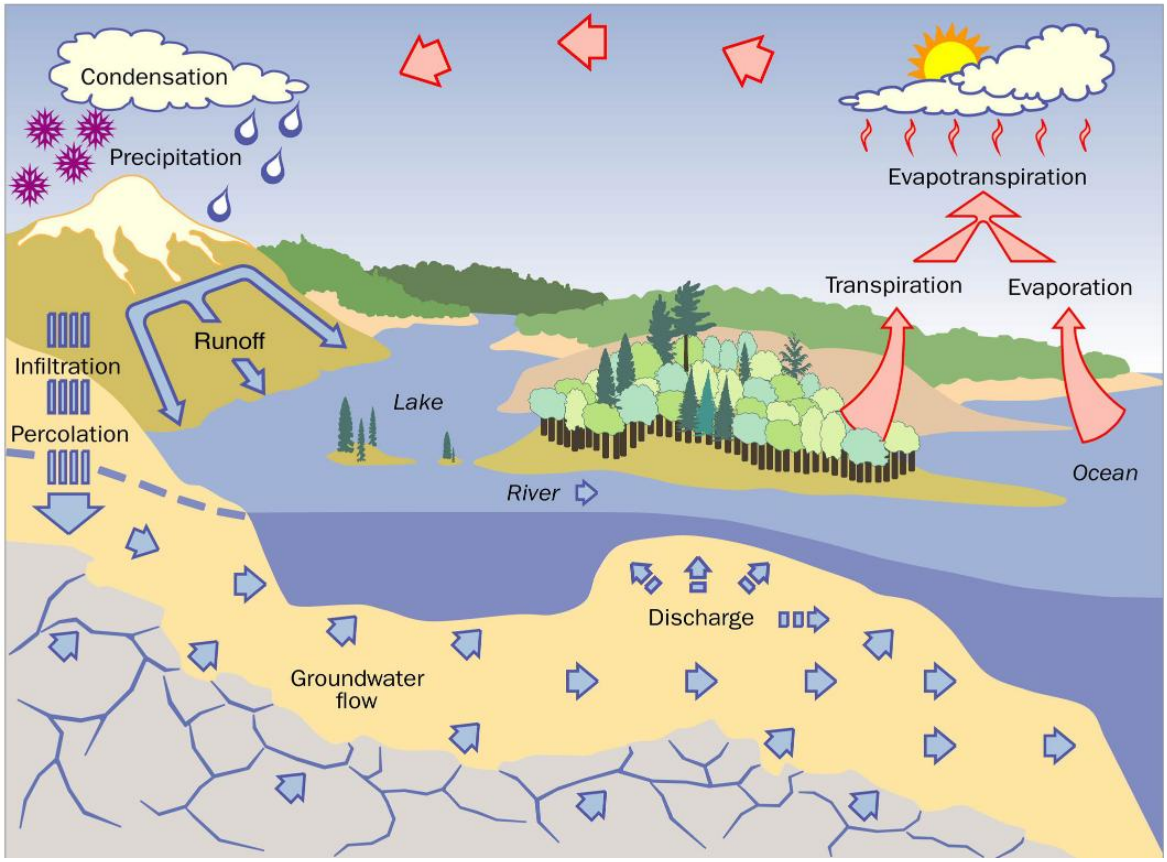


Figure 6 Water Cycle. Source Ontario Government Fact Sheet #21-011

What factors affect the Lake level?

Of course there are many factors that determine actual lake levels; it is a complex tangle of natural phenomena.

A change in the lake level over a specified period is basically determined by the difference between the sums of the water inputs and outputs over that same period.

The main inputs are:

-over-lake precipitation,
-surface runoff,
-groundwater (springs),
-and surface inflows from creeks.

The main outputs are:

-the creek outflow at the culverts to the Crowe River,
- evaporation,
-and possibly a negative groundwater flow from the lake to the aquifer, although it is likely that the net groundwater flow is positive, but diminished.

Chandos Lake depends on groundwater from the underlying aquifer

Chandos Lake is strongly connected hydrologically to the groundwater table, so it is technically a groundwater-fed lake. There aren't any significant lakes or rivers feeding into it, and thus groundwater is the dominant water source.

Typically, in the Canadian Shield a groundwater aquifer resides in a fractured bedrock system. (as opposed to others that reside in porous sand or gravel sediments). It is hard to know how big this aquifer is or how fast the water can flow through it. It gets recharged by rainfall that infiltrates/percolates down through the subsoil to the fractured rock. This groundwater gradually makes its way to the lake. The water table is

defined by the boundary between unsaturated rock and saturated rock, with unsaturated rock containing a mixture of air and water.

For a primer on this see:

https://www.ontario.ca/files/2022-04/omafra-understanding-groundwater-21-011-en-24-11-2021.pdf

The Loon Lake Pluton

Until about 1937 Chandos Lake was called Loon Lake. The Bancroft region was of interest to geologists and miners who determined that our lake was sitting on a Pluton, which they subsequently then called *The Loon Lake Pluton*.

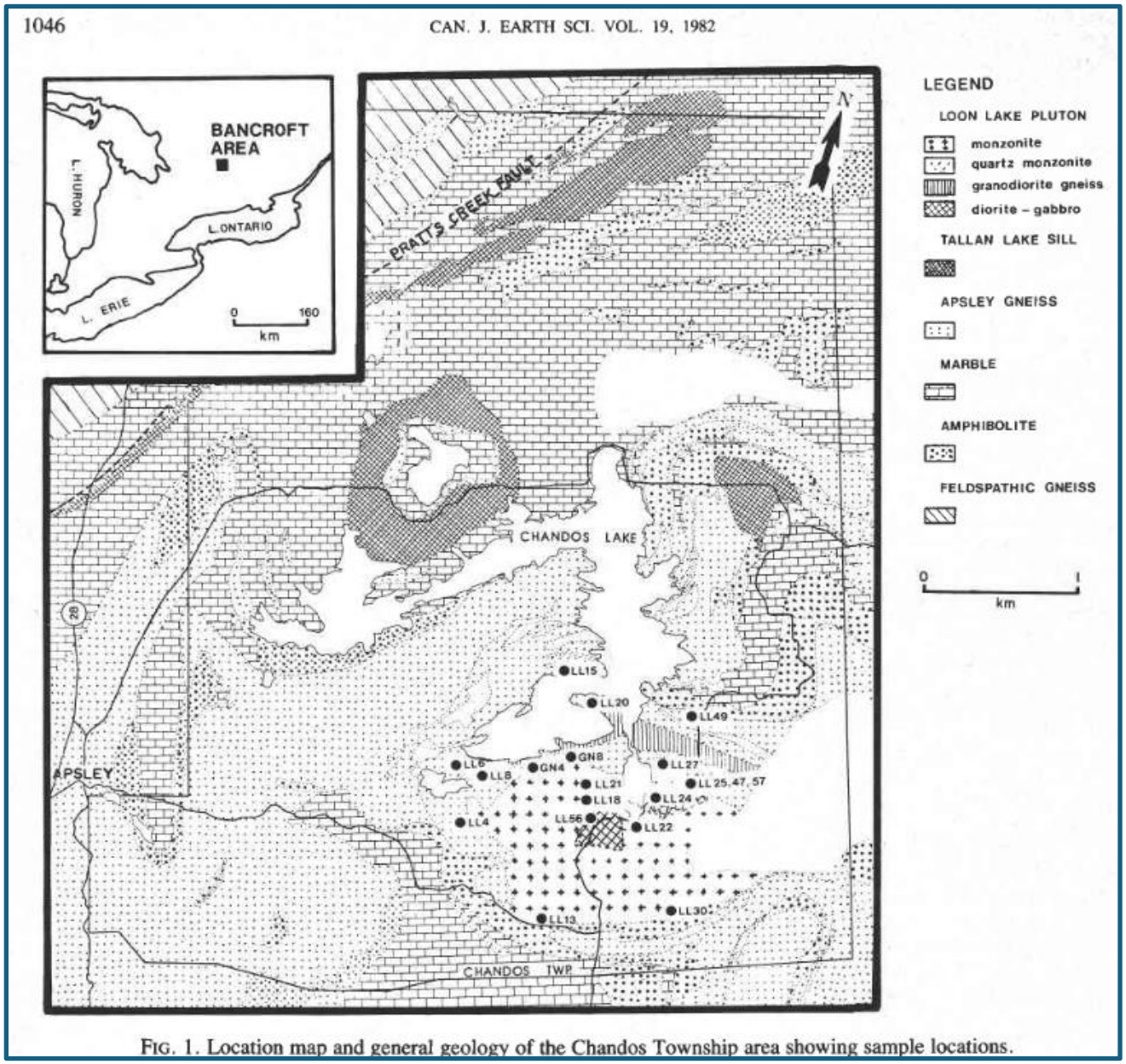


FIG. 1. Location map and general geology of the Chandos Township area showing sample locations.

(see https://chandossier.com/the-loon-lake-pluton/ for more info)

Plutons are intrusive igneous rocks that form when magma cools and solidifies slowly within the Earth's crust. One can think of them as the output of a volcano that doesn't reach the surface. These plutons intrude into older crustal rocks during various Precambrian orogenies. In other words, when there are collisions of the tectonic plates, spaces get created into which hot magma can flow, and this new rock is then called a pluton.

Now the key point here is that the hot magma injects with some force, and cools very slowly. This creates stresses in the parent rock which opens up larger cracks and crevices.

In general, the fractured Precambrian bedrock is not all that permeable, and the water contained in its cracks does not move that fast. However, the fissures created by the pluton allow increased mobility.

Groundwater can then move more freely and in fact can give rise to localized springs which emerge where the water table intersects the lake bottom. The hydraulic pressure from higher locations in the aquifer forces the water into the lake.

How much inflow from groundwater is there?

During the month April 2019, after making some measurements on outflow and lake level, along with some very rough assumptions, the calculated groundwater inflow is thought to be between 50 and 150 cu.ft/sec.

Here are some interesting pictures that probably indicate the existence of underground springs feeding the lake.

Walkes Bay, courtesy of D. Anthony

So the fact that our lake is on a pluton is likely a good part of the reason why Chandos Lake has a strong groundwater feed.

Lack of Rainfall

In times of drought the groundwater table drops and the inflow to the lake diminishes, and, in fact, can even reverse. (From time to time one hears of lakes/rivers that have dried up completely for this reason.) The rainfall in 2024 was below average, and in 2025 it was even more so. The 3rd quarter of 2025 has been exceptionally dry with little rainfall, and so it is very likely that our water table has dropped and as a knock-on effect so has the Chandos Lake level.

Here are some rainfall data for the years 2020 to 2025. In order to estimate rainfall at Chandos, we might average the data from the Peterborough and Bancroft weather stations, mainly because we have no Apsley data. However, because both Chandos and Bancroft are in the Shield and further from the Great Lake influences, it does seem that the Chandos weather is more like that of Bancroft weather than that of Peterborough, and so we will use Bancroft data primarily.

3rd Quarter Rainfall, mm			
year	Bancroft	P'bo	Mean
2020	340	223	281
2021	341	271	306
2022	291	161	226
2023	135	245	190
2024	316	225	270
2025	82	184	133

Figure 7 Rainfall data 2020-25

Sources:
https://bancroft.weatherstats.ca/charts/temperature-quarterly.html
https://peterborough.weatherstats.ca/charts/temperature-quarterly.html

So, from this it can be seen that our high-water year of 2021 (*fig 3)* also had significant rainfall compared to 2025; in fact, the 2025 rainfall *(82 mm)* is only a quarter of that of 2021 *(341mm),* and slightly less than a quarter of 2024 *(316 mm).* This summer, 2025 Q3, was very dry compared to recent years and could be termed a drought.

Because we have no major external incoming water flow such as from upstream lakes or rivers, then precipitation, or the lack thereof, is a major determinator of the Chandos lake level.

When precipitation is abundant, the water table gets recharged, thereby increasing inflows to the lake, but when there is a dry period the aquifer gets depleted. In fact, some folk with wells may be ill-affected by this condition.

And when there is a lot of rain, then a lot of water flows out of the lake, eventually to Lake Ontario. Typically, in normal times, a dynamic equilibrium is reached that determines the level of the lake

No outflow from the lake!

As of the fall of 2025 there is virtually no outflow!

Ice usually forms first in the shallower regions, before the main lake freezes over. Usually, after the main lake has frozen over, the last ice to freeze is at the culvert, due to the flow of water interfering with the formation of ice. Right now, however, even though the lake is far from frozen over, along with ice in the shallower regions, the culvert area is also frozen over due to the absence of flowing water.

Figure 8 Culvert at Outlet - essentially no flow (GRA)

Sources of water loss from Chandos

In terms of outputs, there is the creek to the Crowe River, but with the lake so low, there has been reduced outflow. In fact, because of the silt-up of the culverts, as of November 2025 the outflow is negligible.

Evaporation is another output, and under certain conditions it can be a surprising amount, potentially greater than 300 mm (12 inches) during the 3rd quarter for a lake such as Chandos. And because there were so many hot and sunny days in 2025, evaporation rates would have been even higher.

From the map below, it can be seen that in our area the mean value of the annual loss of water through the evaporation process is 700-900 mm per year. It is not unreasonable to think that the loss rate is highest over the hottest months, and perhaps then in the order of 40-60%, would be lost during the 3rd quarter.

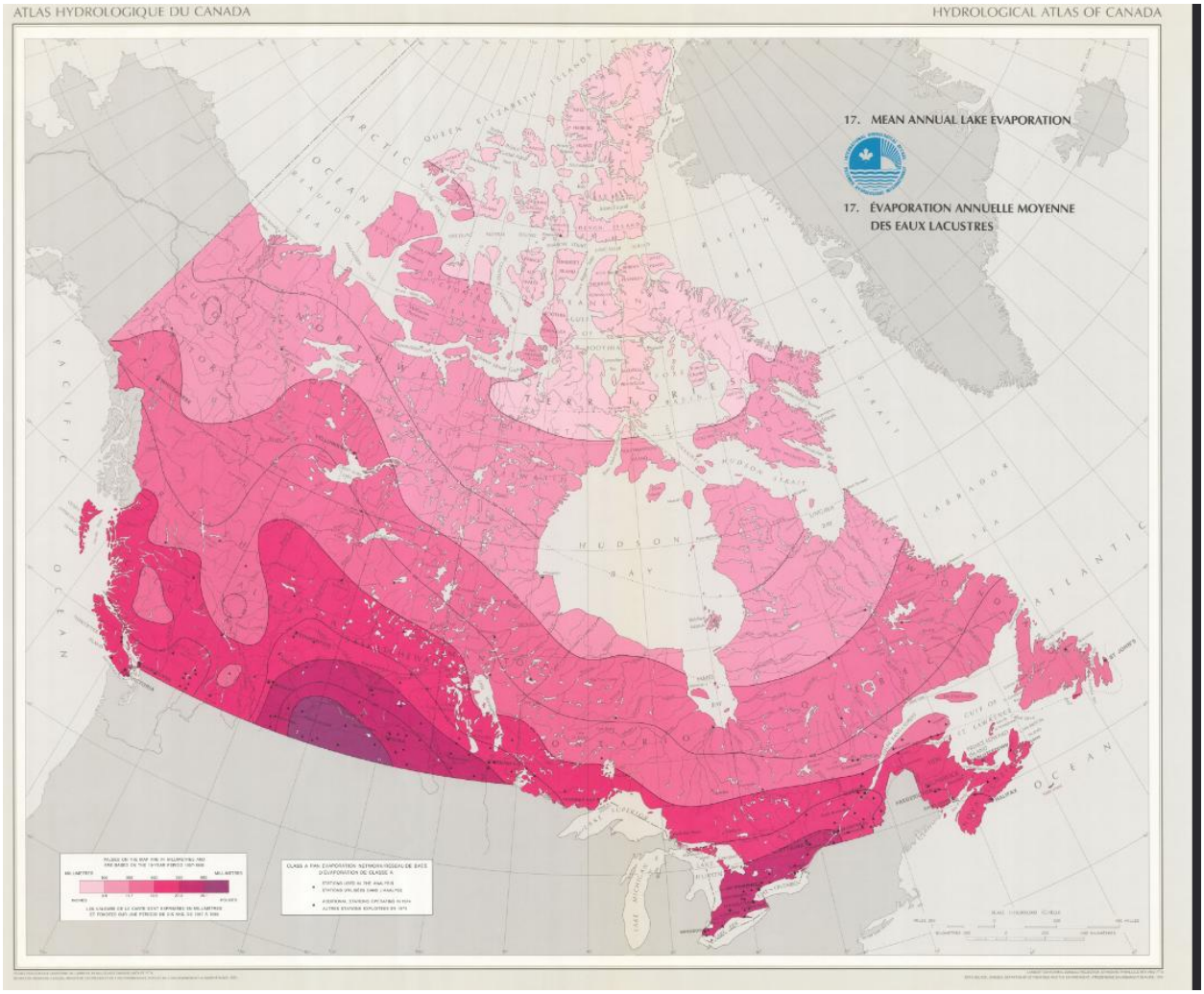
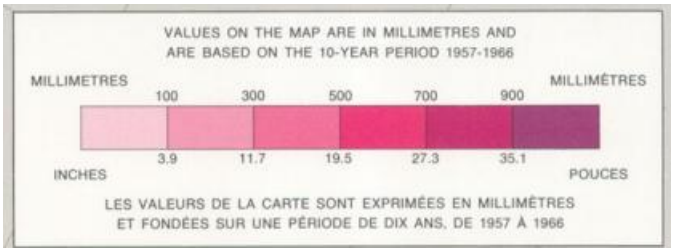


Figure 9 Mean Annual Lake Evaporation Map



The Fig 9 map and explanation can be found here:

https://ftp.geogratis.gc.ca/pub/nrcan_rncan/raster/atlas/eng/hydro_1978/water_quantity_temperature_winds/17_Mean_Annual_Lake_Evaporation_1978_150.pdf

The Evaporation Process

Evaporation is essentially molecules of water escaping the surface to become water vapour in the air. The main factors influencing the rate of evaporation are water surface temperature, air temperature, humidity, amount of wind, and solar radiation. If the surface is warm, the molecules have more energy and the potential for escape is higher. If it is less humid, then the partial pressure of the water vapour in the air is also less, which aids the escape. If it is windy, then the air at the surface tends to be swept away to be replaced by air that is less humid and thus evaporation is increased. Solar radiation is also a factor because it directly heats the surface of the water, so there is more evaporation on sunny days.

Figure 10 Boat Launch low water at Culverts (I. Gorman)

Summary

The very remarkable thing about all this is that in the 3rd quarter, even in a wet year when there is a lot of rain (e.g. 341 mm in 2021), lake-over-precipitation hardly replaces that lost to evaporation (e.g. >300mm). So, the groundwater input is critical to maintaining the lake level, and that depends on adequate precipitation over whatever landmass recharges the aquifer feeding Chandos Lake. (could be 100's of square kilometers)

The primary reason for the drop in lake level appears to be the fact that there was very little rain during the summer of 2025. Apart from not directly adding to the lake level, the lack of precipitation most likely also reduced the groundwater table, which is the major source of water input to Chandos Lake.