

Grand River Conservation Authority

Report number: GM-05-23-46

Date: May 26, 2023

To: Members of the Grand River Conservation Authority

Subject: Current Watershed Conditions as of May 15, 2023

Recommendation:

THAT Report Number GM-05-23-46 – Current Watershed Conditions as of May 15, 2023 be received as information.

Summary:

April was a significantly wet month with warmer than usual temperatures. The month started with high temperatures and considerable rainfall which resulted in the loss of the remaining snowpack and significant amount of runoff. Warmer temperatures were observed throughout April.

Two major rainfall events at the beginning of April and on April 22 to 23 resulted in more than 100 millimeters of rainfall across the watershed. The consequent runoff was used to fill the reservoirs to their mid spring targets. The first half of May has been dry with temperatures consistent with long term averages.

Lake Erie continues to be above the long-term average, but below the levels in 2022. Lake Erie is free of ice.

The long-term forecast over the next three months is for near normal temperatures and near normal precipitation.

Report:

Precipitation

April precipitation was significantly above normal across the watershed. Two major rain fall events at the beginning of the month and on April 22 to 23, along with few smaller events throughout the month resulted in the entire watershed to receive more than 100 millimeters of rainfall. In addition, rain and warmer temperatures resulted in the remainder of the snowpack to fully melt and contribute to observed runoff. While the large amount of rainfall and snowmelt generated substantial runoff across the watershed, no major flooding was observed as the watershed is still recovering from the observed dry conditions since last year and also reservoirs had enough flood storage to prevent major flooding downstream.

Precipitation over the first two weeks of May on the other hand has been below normal, as shown in Table 1. With the exception of the northern portion of the watershed (Luther Area) where observed rainfall has been slightly above normal, almost everywhere else in the watershed has received rainfall lower than long-term averages, ranging from 44 percent in south to around 84 percent in Conestogo Area.

Trends in precipitation, Table 2, show that over the short term, the watershed is showing signs of recovery from dry conditions in 2022. During the month of April, the watershed received rainfall totals which ranged 36 to 65 percent higher than normal. Over the long term, the precipitation levels appear to be closer to normal averages; however, they are still slightly below the long-term average values, specifically for 12 to 18 month periods. In other words, the

watershed is still in a precipitation deficit. In particular, over the past 12 months the watershed has averaged 88 percent of normal precipitation. A prolonged period of at or above normal precipitation is needed for the watershed to recover from the extended dry period in 2022. A visual representation of these trends for the Shand climate station is also provided in Figure 1.

Table 1: Current monthly precipitation for climate stations across the watershed up to May 15, 2023 including the long term average precipitation for half of May.

Climate Station	Current Month Precipitation (millimeters)	Long Term Average Precipitation (millimeters)	Percentage of Long Term Average Percent (%)
Shand	28.8	40.5	71%
Conestogo	37.8	44.7	84%
Guelph	32.5	39.6	82%
Luther	47.4	44.3	107%
Woolwich	18.6	33.9	55%
Laurel	24.0	41.1	58%
Shades	33.7	40.0	84%
Brantford	16.3	37.1	44%

Table 2: Precipitation trends as a percentage (%) of the long-term average over the last 18 months

Climate Station	Last Month	Last 3 Months	Last 6 Months	Last 12 Months	Last 18 Months
Shand	136%	140%	116%	91%	95%
Conestogo	145%	137%	111%	95%	95%
Guelph	143%	134%	114%	91%	92%
Luther	165%	147%	129%	98%	101%
Woolwich	142%	134%	109%	80%	88%
Laurel	155%	138%	110%	80%	84%
Shades	152%	128%	108%	82%	85%
Brantford	157%	176%	128%	96%	95%

Air Temperatures

April was a slightly warmer than normal month. The average temperature during the month was approximately 1.6 degrees above the long-term average. At the Shand Dam climate station, daily maximum temperatures exceeded 20 Celsius for 7 days during the month of April and daily averages ranged between -1 to 19 Celsius with an average daily temperature of 7 Celsius.

The first half of May was warmer than April with temperatures peaking to mid to high Twenties across the watershed. The average temperatures at the Shand Dam climate station over the first two weeks of May was 11 Celsius which is almost equal to long term average for the first half of the month of May.

A visual representation of these trends for the Shand climate station is provided in Figure 2.

Lake Erie Water Levels

During April, the average lake level was approximately 0.48 meters above the long-term average. Levels remained elevated during the first half of May and are approximately 0.32 meters above the long-term average. The forecast for Lake Erie is for lake levels to continue to remain elevated over the spring months following regular seasonal patterns. Lake Erie is currently not ice covered and is anticipated to remain ice free. Figure 3 shows the range of water levels that are expected over the next six months as well as the observed water levels over the last three years.

Reservoir Conditions

Runoff from the rainfall throughout the month of April and snow melt event in early days of the month has been routed through the reservoirs. With the significant amount of runoff generated by rainfall events in April, the Shand, Conestogo and Guelph reservoirs were filled to their normal spring operational targets and are currently in a good condition.

Reservoirs will be used to manage flows during spring rain events over the next couple of months. The amount of flood storage available will be balanced with the amount of runoff expected from precipitation. Year to date reservoir levels and operating rule curves are shown in Figures 4 and 5 for the four largest reservoirs.

Long Range Forecast

Environment and Climate Change Canada is forecasting near normal temperatures and near normal precipitation over the next 3 months.

Flood Preparedness and Flood Centre Activities

Reservoir conditions are being monitored closely and staff continue to hold weekly meetings as part of planning initiatives, dam operations and flood emergency preparedness. Training sessions on the flood program and emergency management are being conducted frequently for new staff and for staff in new roles.

Financial Implications:

Not applicable

Other Department Considerations:

Not applicable

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Figures:

Figure 1: Shand Dam Monthly Precipitation 2019 to May 15, 2023

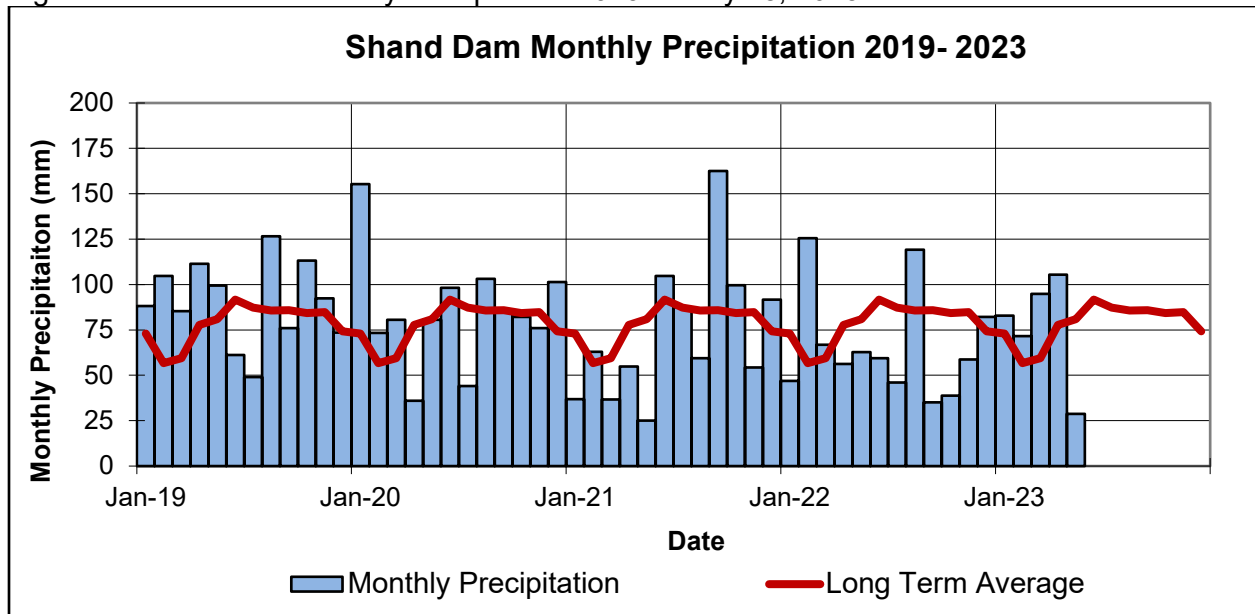


Figure 2: Monthly Average Air Temperatures at Shand Dam from 2019 to May 15, 2023

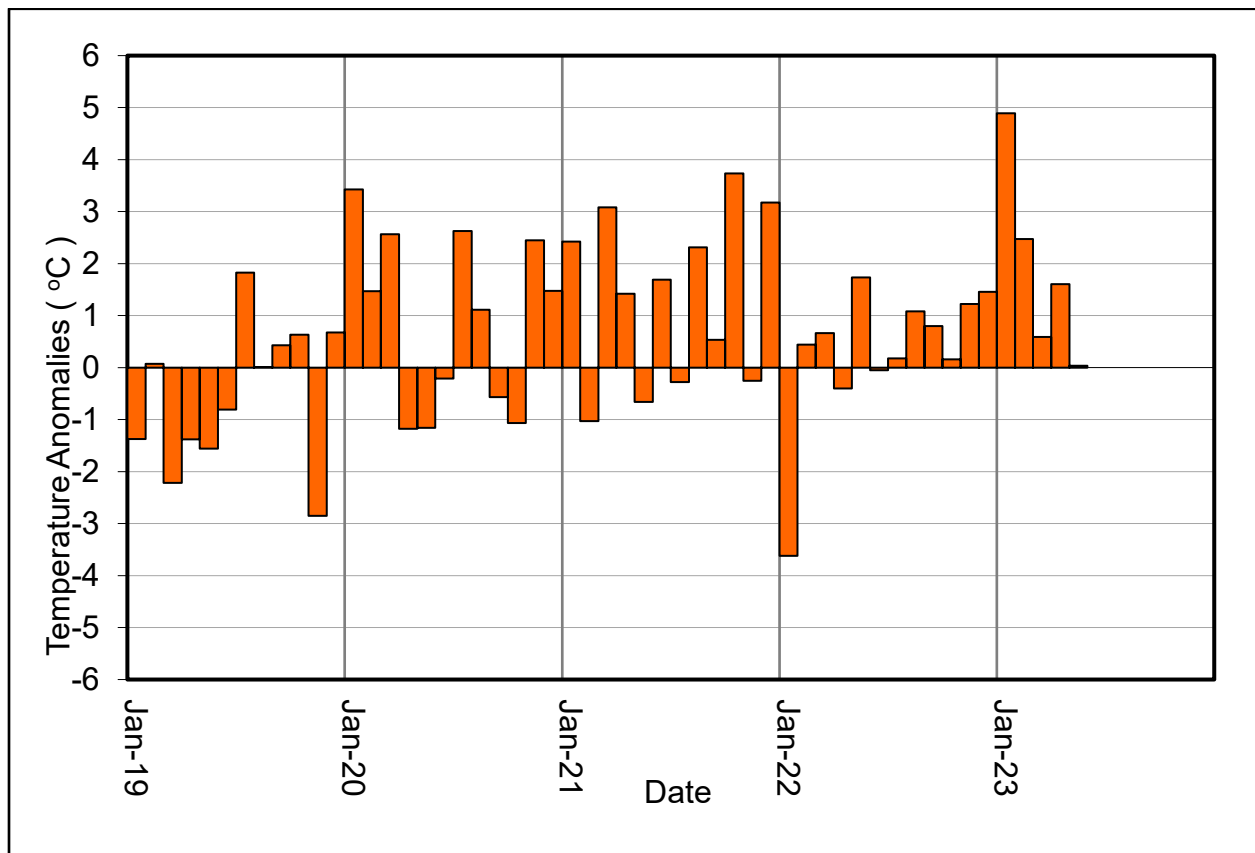


Figure 3: Water levels for Lake Erie at Port Colborne

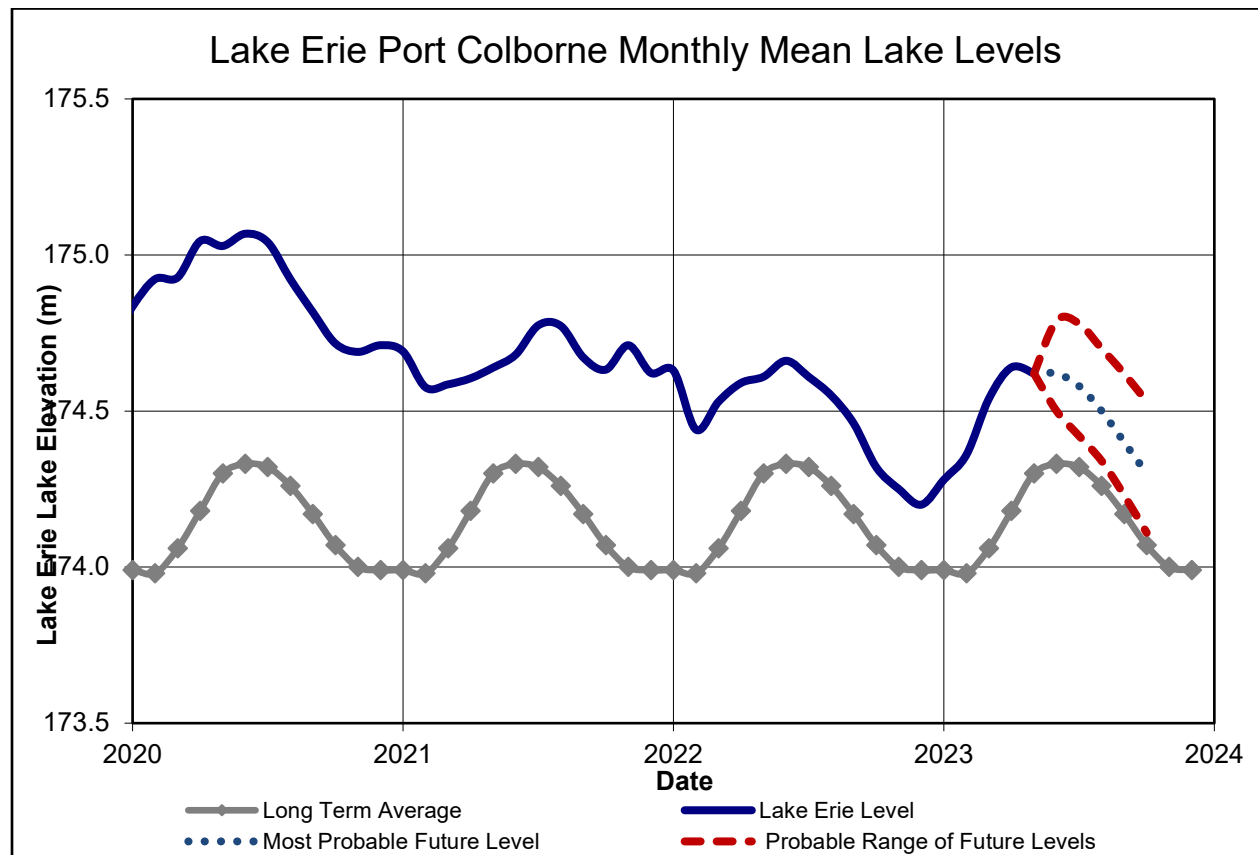


Figure 4: Shand and Conestogo Reservoir Elevation Plots for 2023

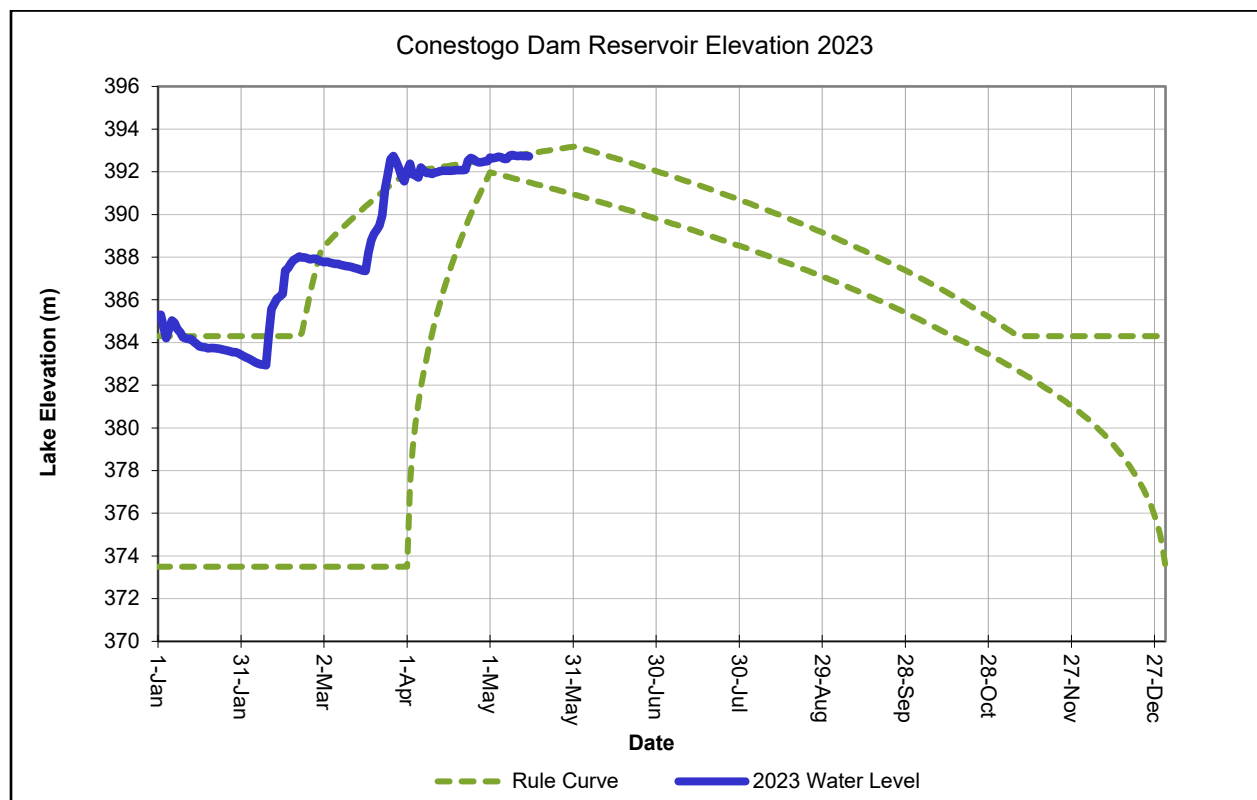
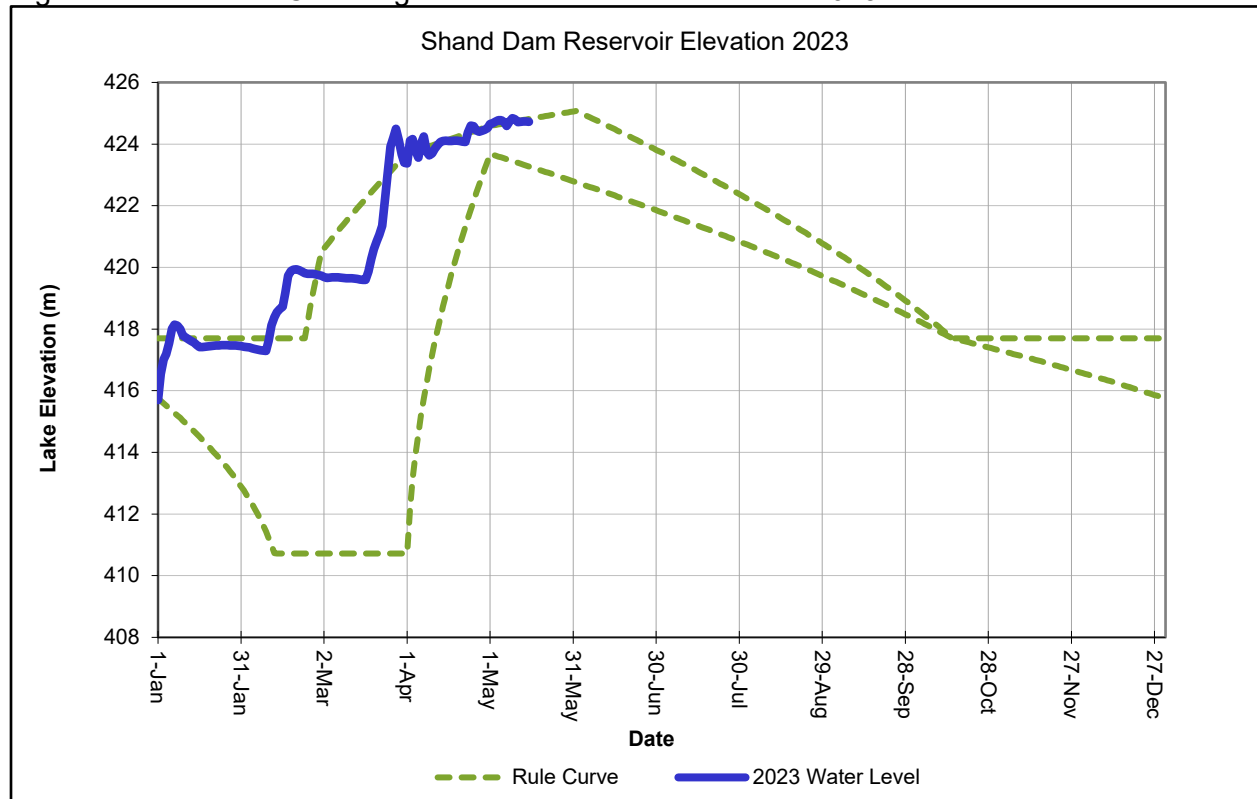


Figure 5: Guelph and Luther Reservoir Elevation Charts for 2023

