

Grand River Conservation Authority

Report number: GM-03-23-29

Date: March 24, 2023

To: Members of the Grand River Conservation Authority

Subject: Current Watershed Conditions as of March 15, 2023

Recommendation:

THAT Report Number GM-03-23-29 – Current Watershed Conditions as of March 15, 2023 be received as information.

Summary:

February was a warm and wet month. The month started with cold temperatures but was dry. Warmer temperatures were observed during mid to late February into March and the snow began to form a snowpack that is near the long-term average or above it in most parts of the watershed.

A large rain and melt event on February 9, 2023, removed much of the snowpack and resulted in a rise in river levels from runoff. The runoff was used to fill the reservoirs to a higher than normal level in mid to late February.

Three major snow storms in late February and early March have resulted in a recovered snowpack and with expected warmer temperatures, the amount of flood storage available in reservoirs over the next few months will be balanced with the amount of water in the snowpack and runoff expected from precipitation.

Lake Erie continues to be above the long-term average, but below levels in 2022. Lake Erie is mostly free of ice. The long term forecast over the next three months is for near normal precipitation and temperatures.

Report:

Precipitation

February precipitation was slightly above normal, mostly in the form of snowfall. The latest snow survey conducted on March 15, showed that many of the northern parts of the watershed had a snowpack slightly above or close to the long term average, while the other parts of the watershed had a relatively higher snowpack. Average depth of snow above the large dams ranges between 25 to 35 cm as per the latest snow survey.

Precipitation over the first two weeks of March has been well above normal for the first half of the month, as shown in Table 1. A winter storm on February 23 brought in 10-15 cm of snowfall across the watershed. A significant winter snow storm occurred on March 3rd resulting in 20-30 cm of snowfall across the watershed and another winter storm brought heavy snow on March 10th. The next snow survey is scheduled for April 1.

Trends in precipitation, Table 2, show that over the short term the watershed is showing signs of recovery from dry conditions in 2022, but over the long term the watershed is still in a precipitation deficit. In particular, over the past 6 and 12 months the watershed has averaged only 80 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 given in Figure 1.

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

Climate Station	Current Month Precipitation (millimeters)	Long Term Average Precipitation (millimeters)	Percentage of Long Term Average (%)
Shand	38.0	29.7	128%
Conestogo	38.4	31.1	123%
Guelph	29.5	28.8	102%
Luther	34.0	32.0	106%
Woolwich	25.4	25.2	101%
Laurel	28.5	29.7	96%
Shades	39.5	30.7	129%
Brantford	29.1	26.6	110%

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	126%	116%	80%	83%	97%
Conestogo	119%	106%	80%	89%	99%
Guelph	107%	119%	76%	81%	98%
Luther	139%	138%	95%	89%	101%
Woolwich	109%	104%	77%	75%	83%
Laurel	119%	109%	75%	70%	90%
Shades	82%	106%	73%	71%	94%
Brantford	162%	126%	87%	81%	100%

Air Temperatures

February was a relatively warm month. The average temperature during the month was approximately 3.2 degrees above the long-term average. At the Shand Dam climate station there were 16 days where temperatures reached above freezing. In southern parts of the watershed there were only 6 days where temperatures stayed below freezing.

The first half of March was cold in comparison to February. The average temperatures at the Shand Dam climate station over the first two weeks of March was negative 3.0 degrees. This is approximately 1.5 degrees above the long-term average for the first half of March. Forecast temperatures over the next few days are for even warmer temperatures.

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

Lake Erie Water Levels

During February, the average lake level was approximately 0.38 meters above the long-term average. Levels remained elevated during the first half of March and are approximately 0.33 meters above the long-term average. The forecast for Lake Erie is for lake levels to continue to increase 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 is expected over the next six months as well as the observed water levels over the last three years.

Reservoir Conditions

Runoff from the melt event in mid-February was being routed through the reservoirs. With the early loss of the snowpack, the Shand and Conestogo reservoirs were filled to a level closer to a March 1st level. The Guelph reservoir has almost recovered from dry conditions in 2022 and is close to its normal winter level. Based on the latest snow survey results, it is anticipated that reservoirs can be filled to their spring target once warmer temperatures are observed.

Reservoirs will be used to manage flows during melt or rain events over the next couple of months. The amount of flood storage available will be balanced with the amount of water in the snowpack and 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 slightly below 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 underway for new staff and for staff in new roles.

The spring flood coordinators meeting was held on February 22 with municipal flood coordinators, community emergency management coordinators, police, other agencies and GRCA staff involved with the GRCA flood warning system. The meeting was well attended and described in a separate board report.

Financial Implications:

Not applicable

Other Department Considerations:

Not applicable

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Figures:

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

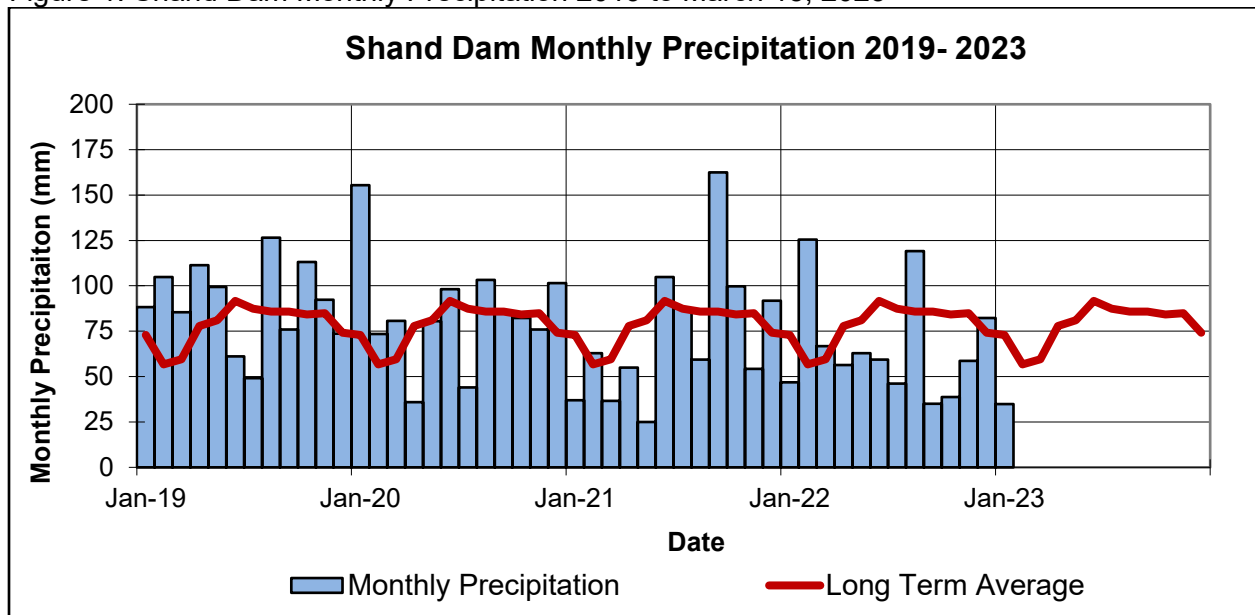


Figure 2: Monthly Average Air Temperatures at Shand Dam from 2019 to March 15, 2023

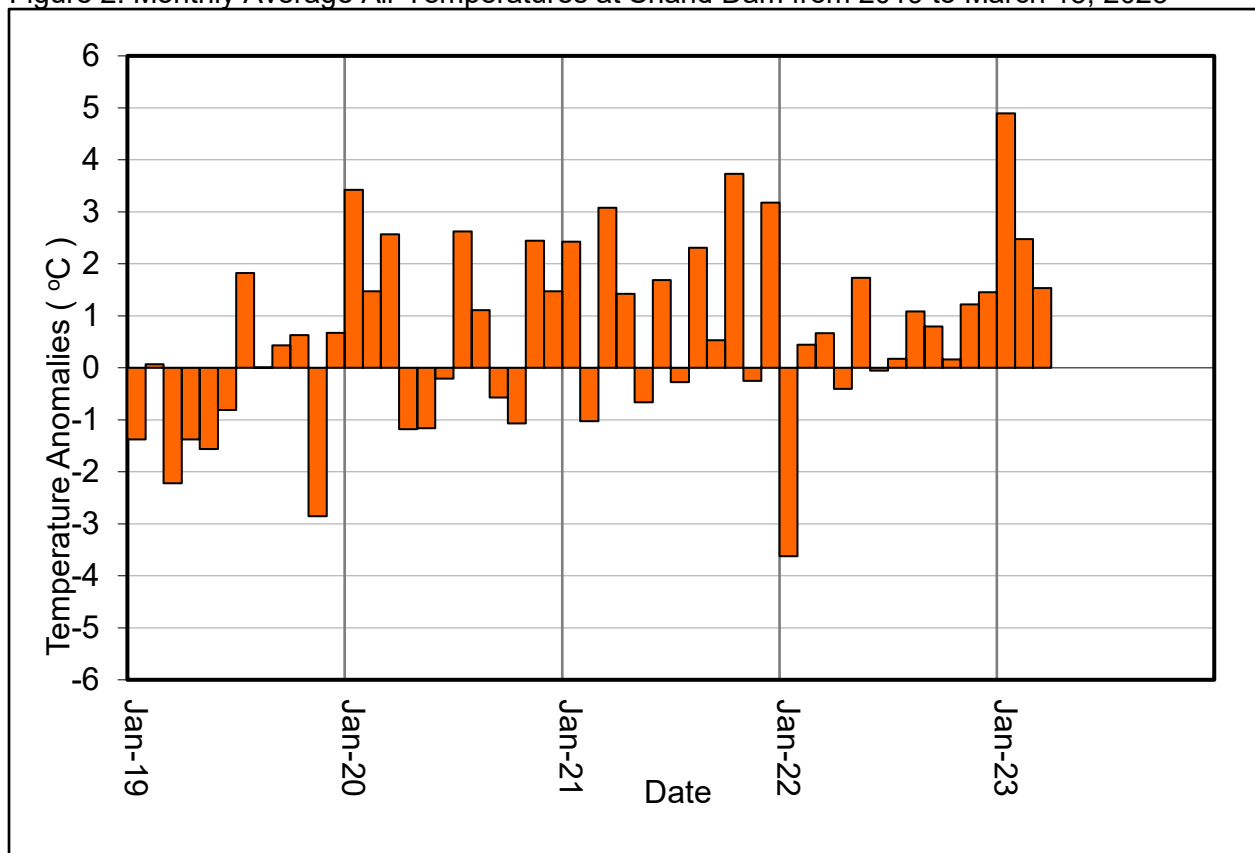


Figure 3: Water levels for Lake Erie at Port Colborne

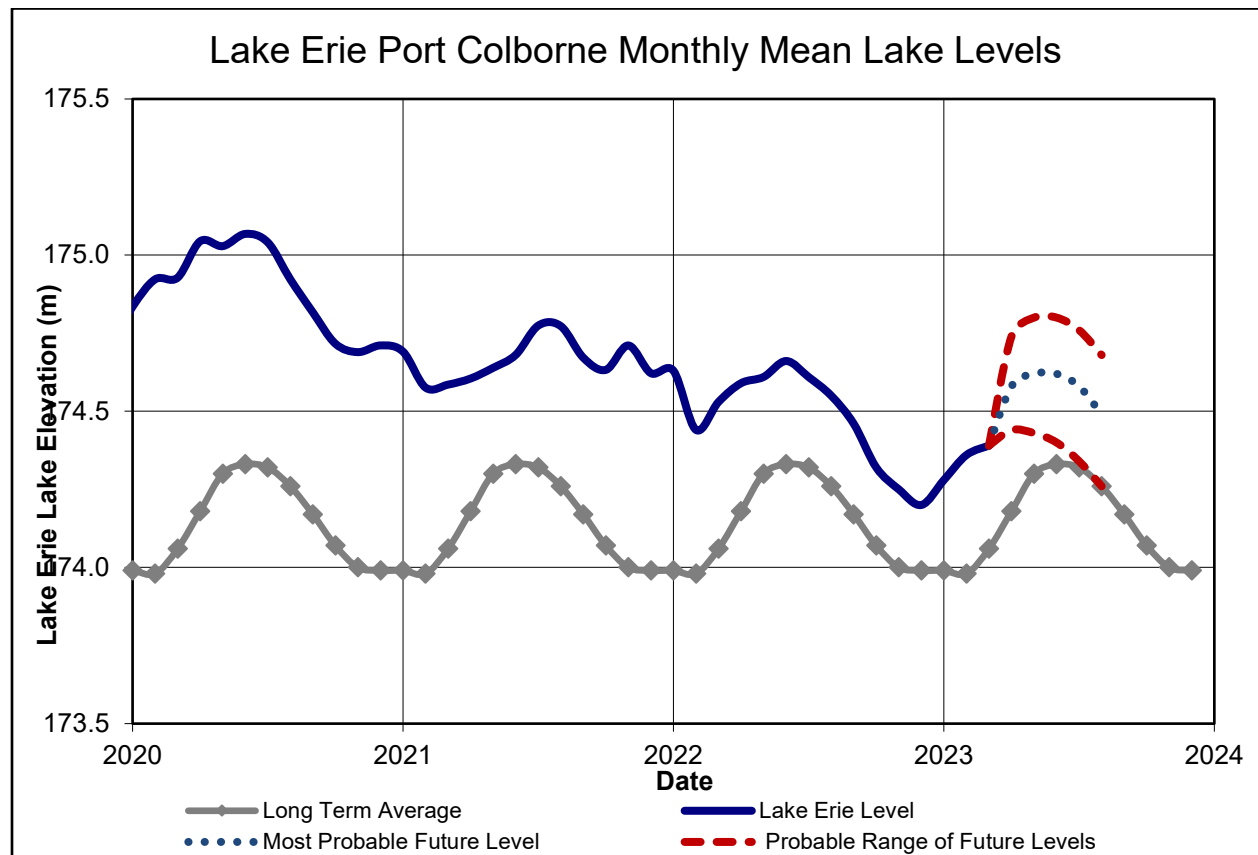


Figure 4: Shand and Conestogo Reservoir Elevation Plots for 2023

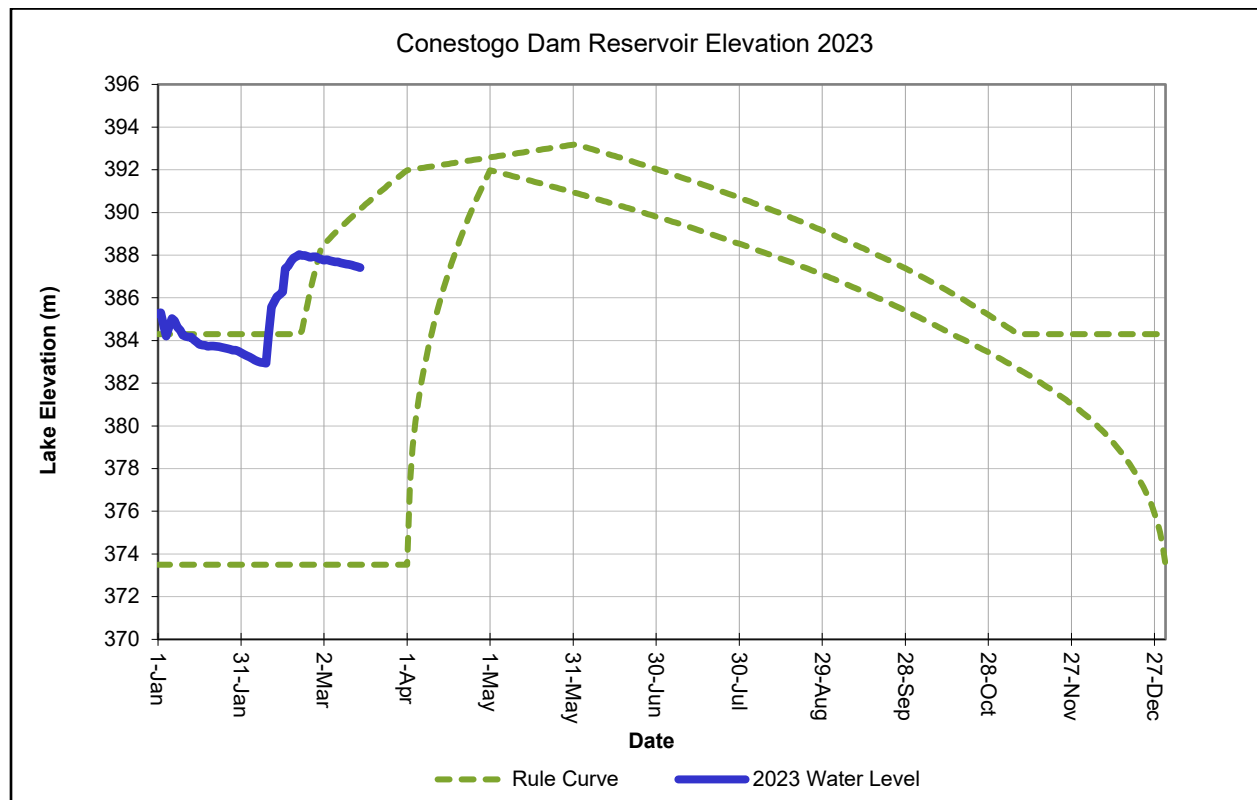
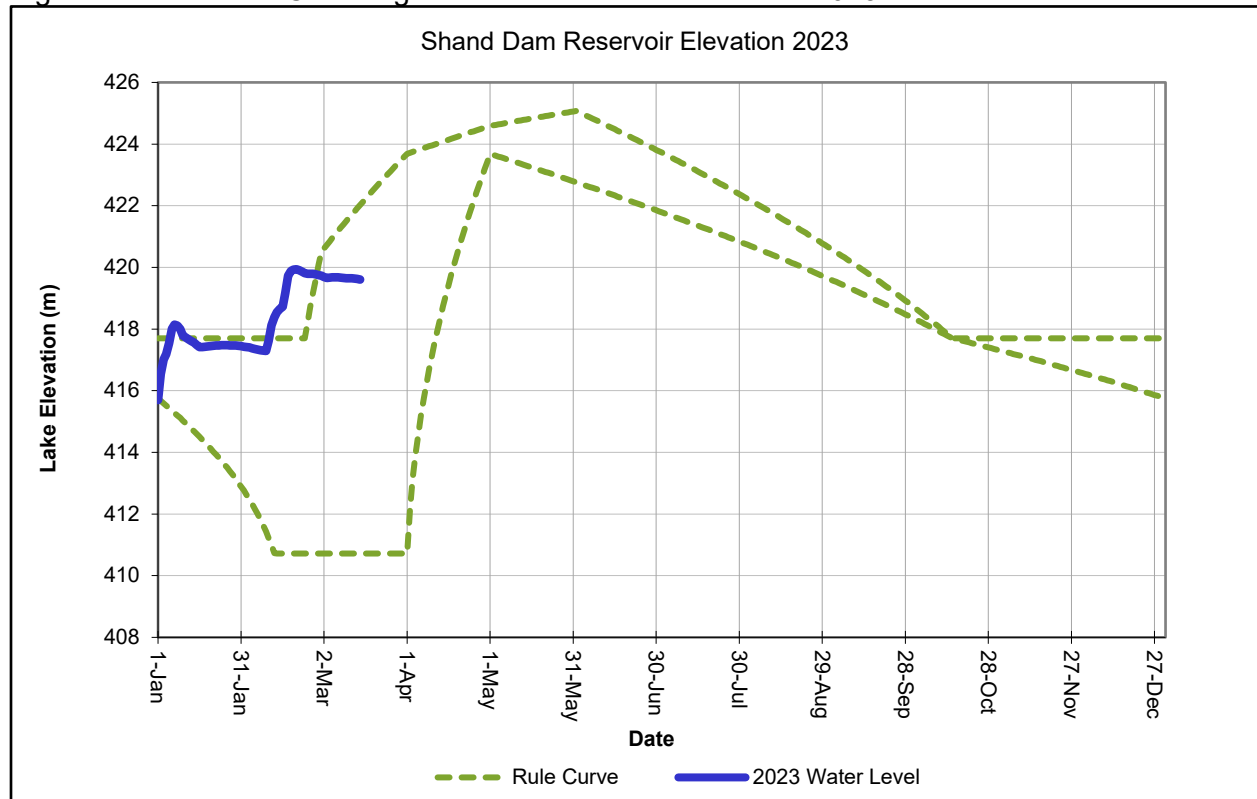


Figure 5: Guelph and Luther Reservoir Elevation Charts for 2023

