

Grand River Conservation Authority

Report number: GM-11-23-89

Date: November 15, 2023

To: Members of the Grand River Conservation Authority

Subject: Current Watershed Conditions as of November 15, 2023

Recommendation:

THAT Report Number GM-11-23-89 – Current Watershed Conditions as of November 15, 2023 be received as information.

Summary:

October was generally warmer than usual with precipitation slightly higher than September but still below long-term average levels. The temperatures across the watershed remained higher than the long-term average throughout the month with multiple days above 20 degrees Celsius. During the month of October, the watershed has observed precipitation levels that have been around 80% of long-term averages, ranging from as low as 69 percent in Cambridge to 92 percent in Bellwood area.

Higher than normal precipitation during summer along with improved groundwater conditions prompted the Low Water Response Team to remove the watershed from Level 1 low water conditions and return the entire watershed to normal conditions as of September 13, 2023, but lower rainfall in September and October may impact watersheds recovery. All reservoirs are within their normal operating range.

Lake Erie continues to be above the long-term average, and between the levels in 2021 and 2022. The long-term forecast over the next three months is for above normal temperatures and near normal precipitation.

Report:

Precipitation

After a wet summer and significant precipitation in June, July and August, the watershed experienced a dry fall with significantly lower precipitation in the month of September. Precipitation in October has been slightly higher than September. Precipitation over the first two weeks of November has also been lower than long-term averages, ranging between 58 percent in Kitchener/Waterloo area to 80 percent in Shand Dam area, as shown in Table 1. This may potentially be the result of the El Nino phenomena observed this fall.

Trends in precipitation, as presented in Table 2, show that during the month of October, the watershed has observed precipitation levels that have been around 80 percent of long-term averages, ranging from 69 percent in Cambridge to 92 percent in Shand Dam area. Over the mid-term, the watershed shows signs of recovery from dry conditions in 2022 with normal to above normal precipitation at most locations. Over the long term, the precipitation levels appear to approach normal long-term averages. A visual representation of these trends for the Shand climate station is provided in Figure 1.

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

Climate Station	Current Month Precipitation (millimeters)	Long Term Average Precipitation (millimeters)	Percentage of Long Term Average Percent (%)
Shand	36.8	42.4	87%
Conestogo	28.4	47.6	60%
Guelph	30.5	40.2	76%
Luther	35.6	46.2	77%
Woolwich	29.6	34.8	85%
Laurel	24.4	41.8	58%
Shades	25.3	38.9	65%
Brantford	29.3	36.8	80%

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	92%	87%	100%	107%	94%
Conestogo	79%	79%	100%	105%	97%
Guelph	74%	77%	99%	106%	94%
Luther	78%	73%	100%	113%	99%
Woolwich	78%	76%	101%	103%	88%
Laurel	96%	75%	86%	97%	82%
Shades	69%	81%	107%	108%	91%
Brantford	79%	68%	90%	106%	94%

Air Temperatures

October was generally warmer than usual across the watershed. At the beginning of the month, multiple days with maximum temperatures exceeding 20 degrees Celsius were observed across the watershed. The average temperature across the watershed during the month of September was approximately 2.4 degrees above the long-term average. At the Shand Dam climate station, daily maximum temperatures exceeded 20 degrees Celsius for 7 days during the month of October and daily averages ranged between 2 to 21 degrees Celsius with an average daily temperature of 10.7 degrees Celsius.

The air temperature during the first half of November has been typical for this time of the year. The average temperature at the Shand Dam climate station over the first two weeks of November was 3.5 degrees Celsius which is same as the long-term average for the first half of the month of November.

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

Lake Erie Water Levels

During October, the average lake level was approximately 0.25 meters above the long-term average. Levels remained elevated during the first half of November and are approximately 0.28 meters above the long-term average. The forecast for Lake Erie is for lake levels to continue to remain above the long-term average over the fall and winter months following regular seasonal patterns. 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

The large reservoirs are generally closer to the top of their normal operating levels with the exception of Shand dam which is at the lower range of normal operating level, mainly due to drier conditions in the fall, specifically September. Flows through the watershed continue to be above the flow augmentation targets.

Reservoirs have been used to augment river flows during the fall. Through Kitchener, augmentation levels dropped from around 60 percent at the beginning of October to around 20 percent at the end of the month. In Brantford, augmentation levels dropped from around 35 percent in early October to around 15 percent at the end of October. On Speed River, augmentation levels dropped from around 50 percent at the beginning of October to around 25 percent at the end of the month. These declines may be attributed to the increase in rainfall in October, compared to September. 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 above normal temperatures and closer to normal precipitation for the watershed over the 3 months of November, December, and January.

Low Water Response

The above normal precipitation during the summer months and observed signs of groundwater recovery in targeted monitoring locations resulted in the removal of the watershed from level 1 low water conditions and return of the entire watershed to normal conditions as of September 13, 2023.

While the watershed is currently under normal conditions with respect to low water, the low precipitation levels observed during the months of September and October along with potential consequences of the El Nino phenomena may impact the watershed's full recovery from the dry conditions observed during the previous year. The low water response team will closely monitor the conditions and assess the watershed's status based on observed precipitation and groundwater conditions.

Flood Preparedness

Reservoir conditions are being monitored closely and staff continue to hold weekly meetings as part of planning initiatives, dam operations and flood emergency preparedness.

County of Brants annual Emergency Management Exercise was conducted on October 19, at the Emergency Operations Centre located at OPP station in Paris. GRCA staff participated in the exercise and attended the EOC in person, providing support during the exercise as a member of the operations team. As part of the exercise, GRCA staff provided travel time for a significant amount of fuel spill occurring at Highway 403 on the Grand River, in collaboration with representatives from police, fire department and County staff.

Senior Operators, Duty Officers and Communications will be attending Incident Management System Training in November. This system is used to manage many types of incidents, especially those requiring an emergency response and is used by our municipalities and emergency services (police, fire, paramedics).

The fall 2023 Flood Coordinators Meeting is scheduled for December 5, 2023, and will be held in-person this year. In addition to information on the Flood Warning system, Trudy Kidd, Operational Meteorologist from Environment Canada, will give a presentation on severe weather in the Grand River Watershed.

Financial Implications:

Not applicable

Other Department Considerations:

Not applicable

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Figures:

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

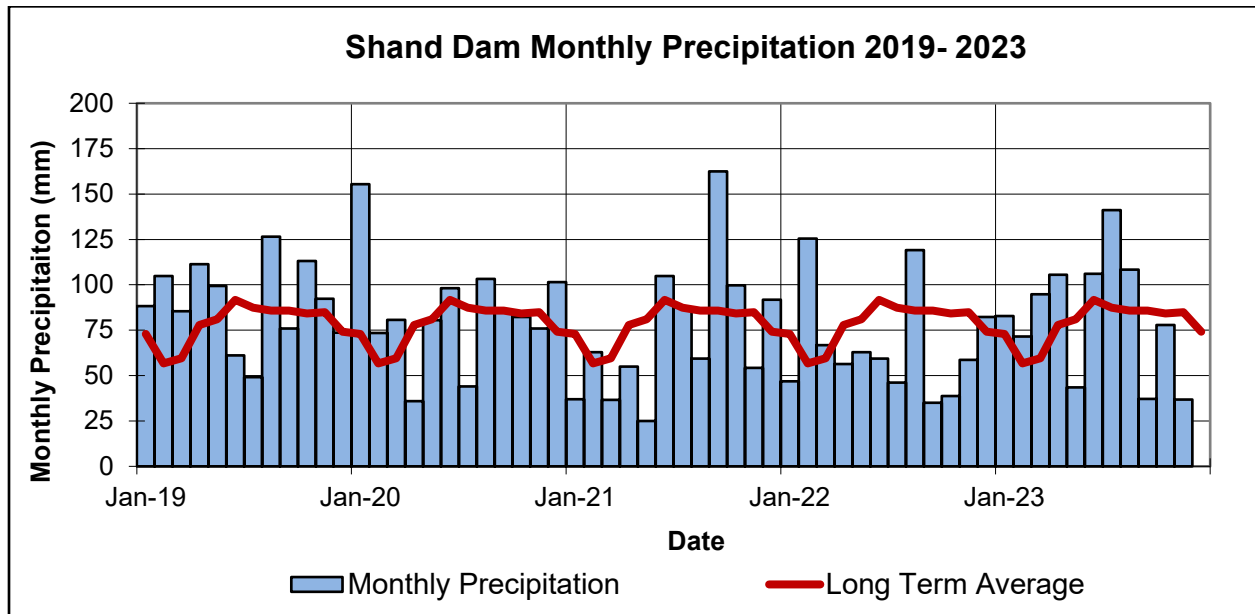


Figure 2: Monthly Average Air Temperatures at Shand Dam from 2019 to November 15, 2023

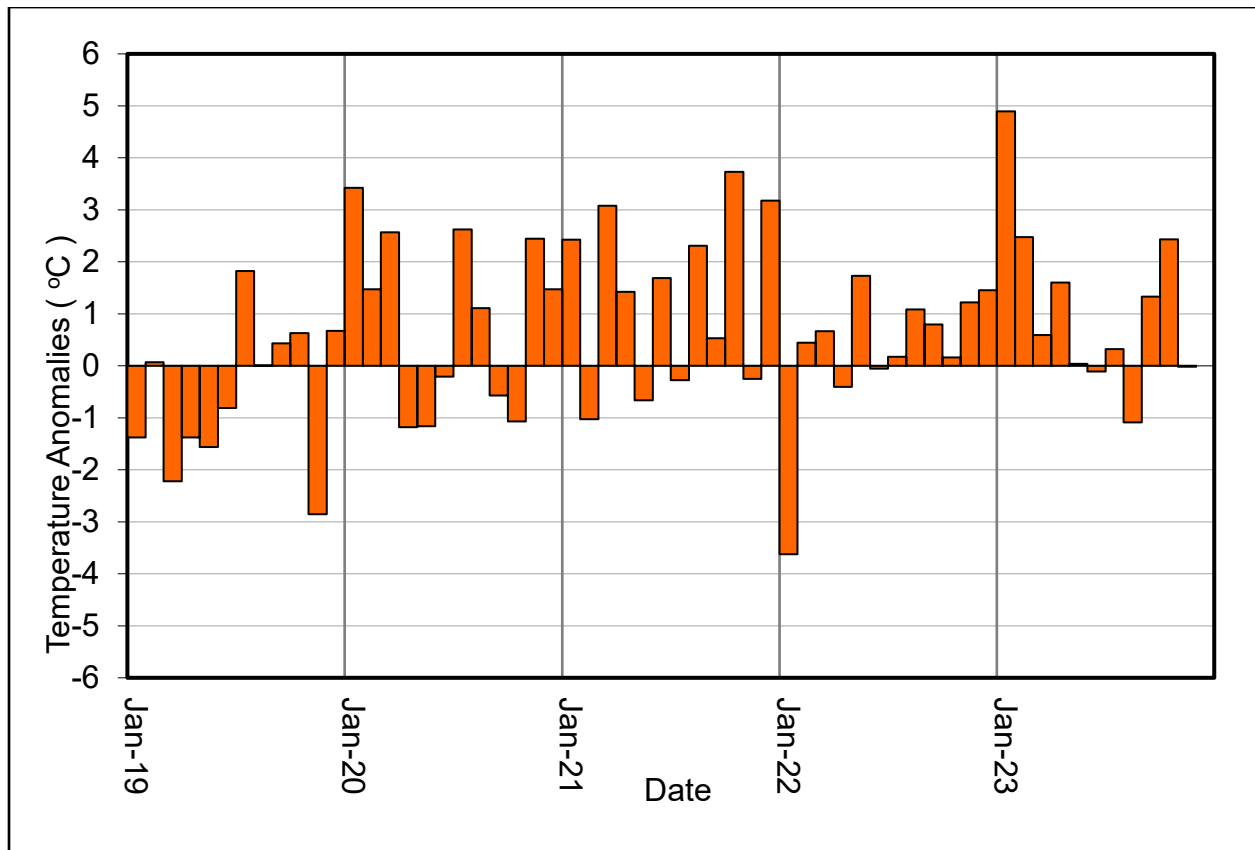


Figure 3: Water levels for Lake Erie at Port Colborne

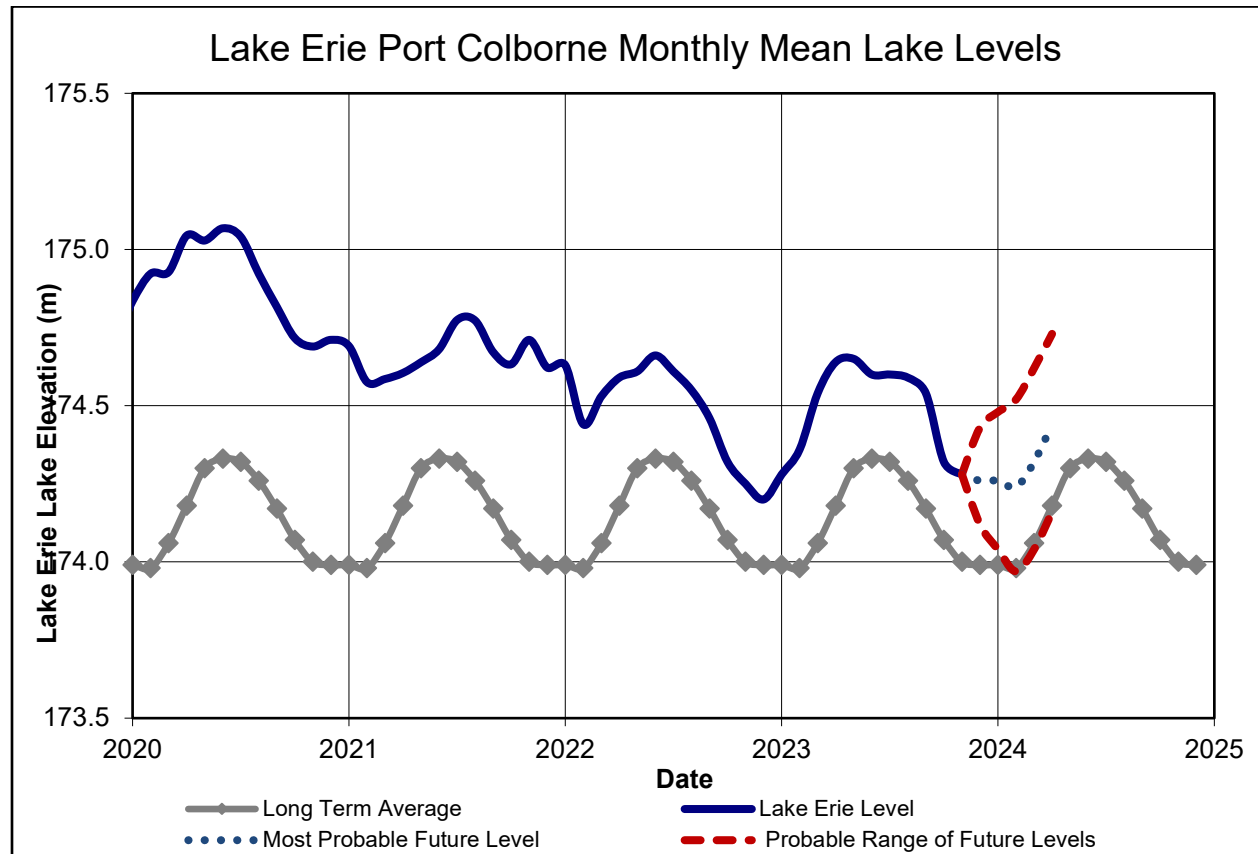


Figure 4: Shand and Conestogo Reservoir Elevation Plots for 2023

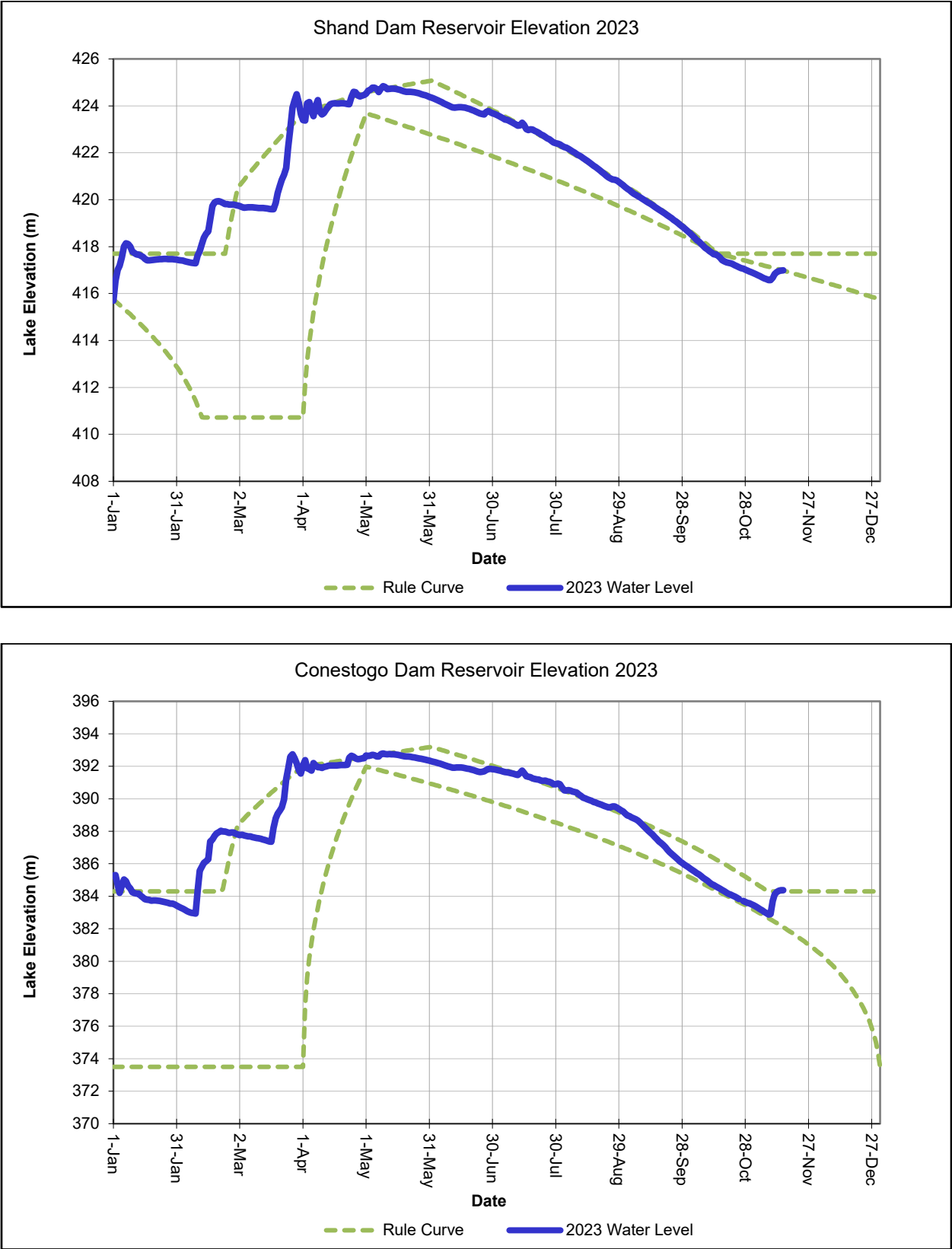


Figure 5: Guelph and Luther Reservoir Elevation Charts for 2023

