

# Grand River Conservation Authority

**Report number:** GM-10-23-79

**Date:** October 17, 2023

**To:** Members of the Grand River Conservation Authority

**Subject:** Current Watershed Conditions as of October 16, 2023

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## **Recommendation:**

THAT Report Number GM-10-23-79 – Current Watershed Conditions as of October 17, 2023 be received as information.

## **Summary:**

September was a dry month with slightly warmer than average temperatures. The month started with warmer temperatures and very low precipitation. The temperatures across the watershed remained slightly higher than the long-term average throughout the month with multiple days above 30 degrees Celsius. During the month of September, the watershed has observed precipitation levels that have been less than half of long-term averages, ranging from as low as 9 percent in Brantford to 48 percent in Woolwich.

Higher than normal precipitation during the months of June, July, and August 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. 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**

Despite a wet summer and significant precipitation in June, July and August, the watershed received significantly lower precipitation in the month of September. Precipitation over the first two weeks of October has also been generally lower than long-term averages but proportionally higher than September, 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 September, the watershed has observed precipitation levels that have been less than half of long-term averages, ranging from only 9 percent in Brantford to 48 percent in Woolwich. Over the mid-term, the watershed shows signs of recovery from dry conditions in 2022 with 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 October 16, 2023 including the long-term average precipitation for half of September.

Climate Station	Current Month Precipitation (millimeters)	Long Term Average Precipitation (millimeters)	Percentage of Long Term Average Percent (%)
Shand	35.6	42.1	85%
Conestogo	35.4	46.5	76%
Guelph	35.3	39.0	91%
Luther	37.3	44.6	84%
Woolwich	27.4	34.1	80%
Laurel	53.8	42.6	126%
Shades	33.2	40.0	83%
Brantford	26.9	34.8	77%

**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	43%	111%	106%	103%	93%
Conestogo	42%	116%	111%	102%	97%
Guelph	29%	119%	110%	104%	93%
Luther	25%	107%	113%	112%	99%
Woolwich	48%	120%	110%	101%	90%
Laurel	19%	97%	95%	93%	80%
Shades	26%	132%	120%	107%	90%
Brantford	9%	103%	101%	103%	93%

### Air Temperatures

September was slightly warmer than usual across the watershed. At the beginning of the month, multiple days with maximum temperatures exceeding 30 C were observed across the watershed. The average temperature across the watershed during the month of September was approximately 1.3 degrees above the long-term average. At the Shand Dam climate station, daily maximum temperatures exceeded 25 degrees Celsius for 5 days during the month of September and daily averages ranged between 12 to 25 degrees Celsius with an average daily temperature of 16.5 degrees Celsius.

The first half of October was also warm with temperatures peaking in the high twenties across the watershed in the first week of October. The average temperature at the Shand Dam climate station over the first two weeks of October was 12.3 degrees Celsius which is 2.2 degrees warmer than the long-term average for the first half of the month of October.

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

## **Lake Erie Water Levels**

During September, the average lake level was approximately 0.37 meters above the long-term average. Levels remained elevated during the first half of October and are approximately 0.33 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 within their normal operating levels. The Conestogo reservoir has been drawn down more than normal over the month of September to allow for regular maintenance on the gates. Flows through the watershed continue to be above the flow augmentation targets.

Reservoirs will be used to manage flows during fall rain events over the next couple of months as well as to augment the flows above the low flow targets as needed. 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.

The reservoirs have been used for augmentation to meet low flow targets between summer thunderstorms. Approximately 25 percent to 70 percent of the flows in the Grand River through Kitchener and approximately 20 percent to 40 percent of the flows in the Grand River through Brantford having been augmented from the reservoirs during periods without rainfall during the month of August (reference. Figure 6). On the Speed River approximately 40 percent to 75 percent of the water downstream of Guelph has been augmented from reservoir discharges during the month of September (reference. Figure 7)

Blue-green algae blooms have been observed in the Woolwich and Belwood reservoirs since late August and in Conestogo reservoir since late September. Warning signs have been posted at all areas advising visitors to avoid contact with blue-green algae when it is present. Downstream drinking water intakes, the Ministry of the Environment and Conservation parks (MECP) and local public health units have been notified and will be updated, if conditions change.

## **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 October, November and December.

## **Low Water Response**

The Low Water Response Team met to discuss the potential of returning the watershed from a Level 1 condition to a normal condition on Wednesday September 6, 2023. As a result of this meeting, the watershed was removed from level 1 low water conditions and the entire watershed returned to normal conditions as of September 13, 2023. This decision was driven by above normal precipitation during the months of June, July and August and observed signs of groundwater recovery in targeted monitoring locations across the watershed.

While the watershed is currently under normal conditions with respect to low water, the significantly low precipitation levels observed during the month of September and 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.

The Annual Ontario Flood Forecasting and Warning Workshop was held in-person on September 18 and 19. The workshop has covered a range of topics related to flood forecasting and warning. Staff from GRCA have participated in organization of the workshop along with other members on the provincial flood forecasting and warning committee members and have provided two presentations at the workshop.

A dam break exercise was conducted by Centre Wellington Municipal Emergency Control Group on October 3, 2023 as part of the municipality's annual exercise. GRCA staff provided input in scenario preparation for an exercise simulating a Shand Dam break scenario and Senior Operators actively participated in the exercise. Participation in these emergency preparedness exercises is an important opportunity to explain the flood warning system to emergency response staff and improve overall preparedness for flood emergencies.

**Financial Implications:**

Not applicable

**Other Department Considerations:**

Not applicable

**Prepared by:**

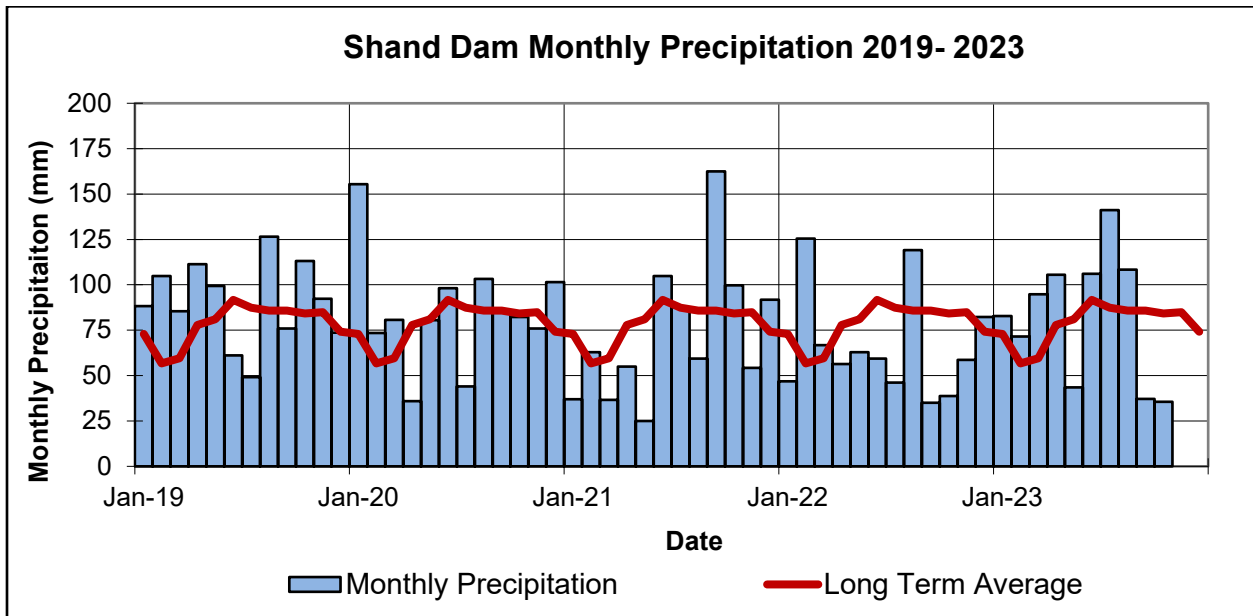
Vahid Taleban, M. Sc., P. Eng.  
Manager of Flood Operations

**Approved by:**

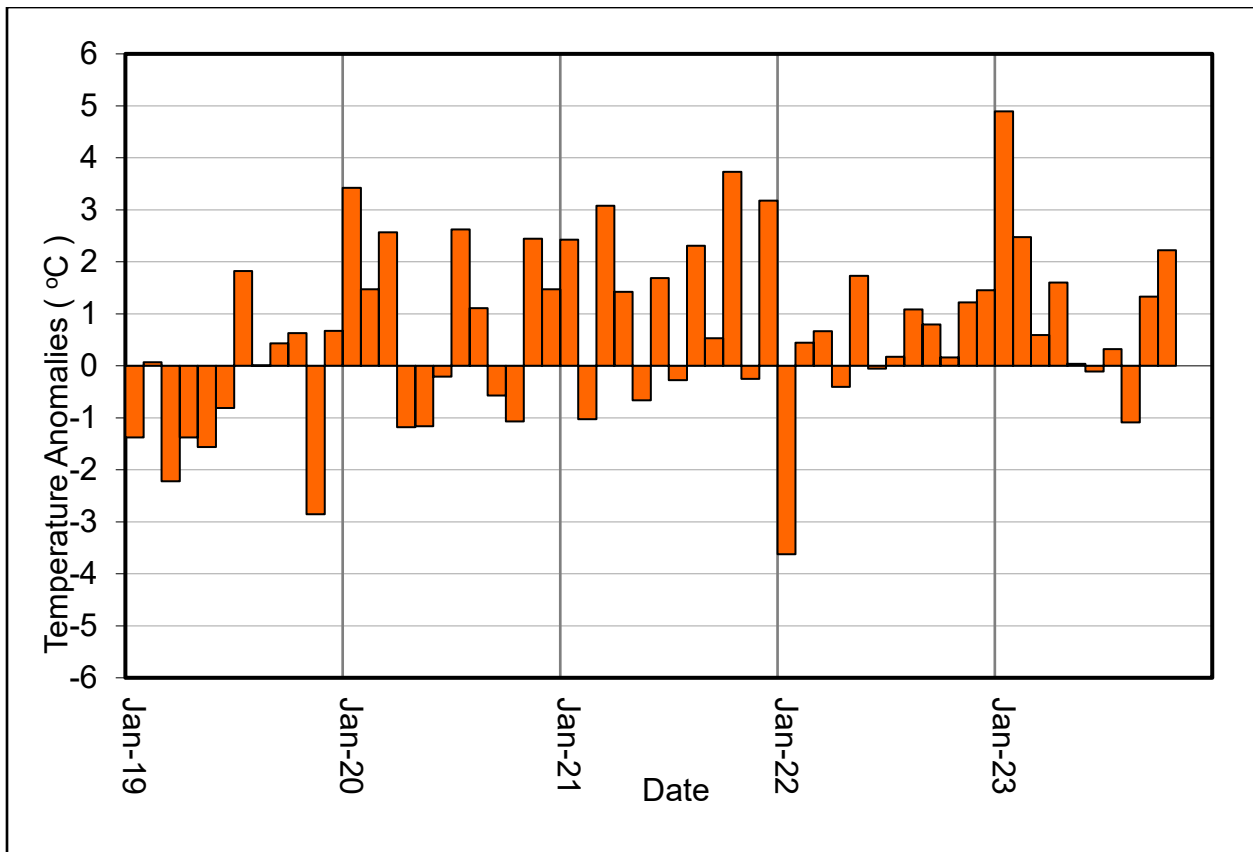
Samantha Lawson  
Chief Administrative Officer

**Figures:**

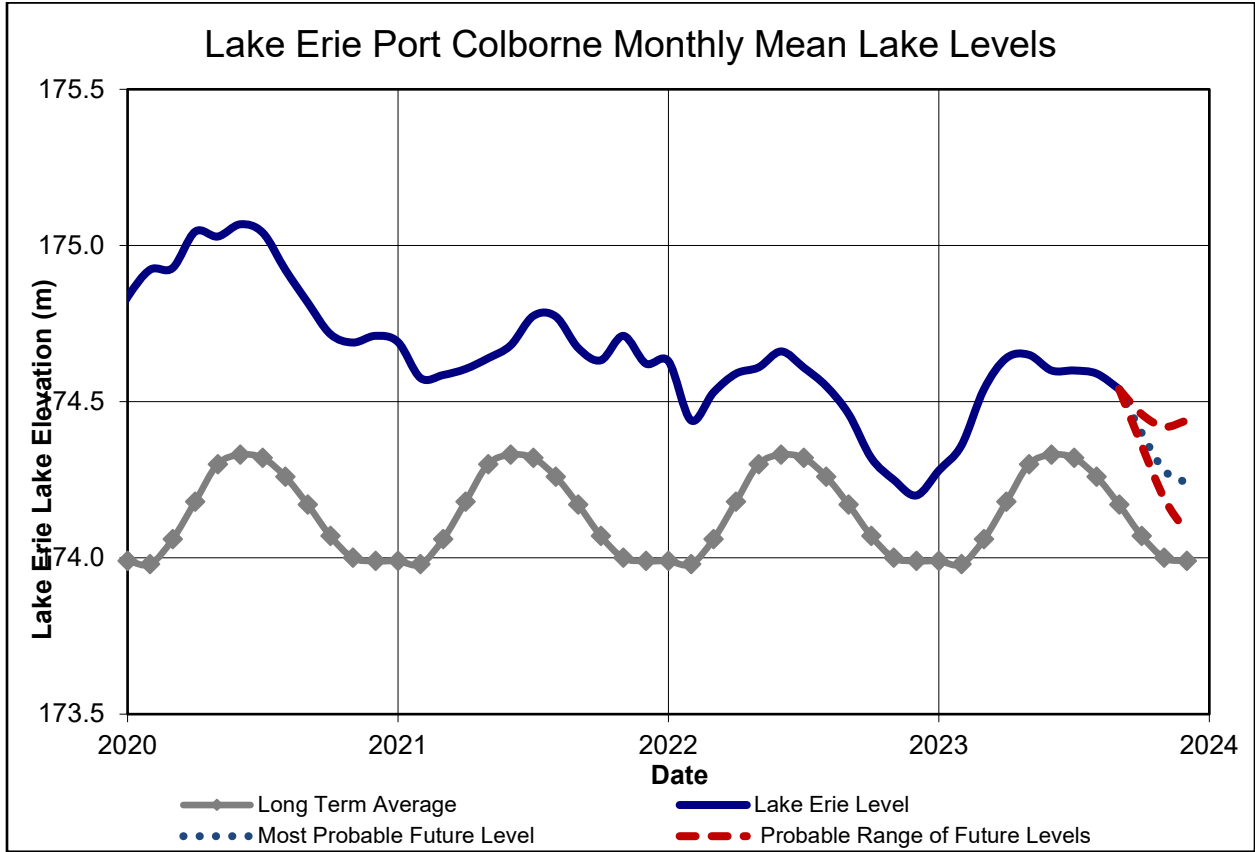
**Figure 1:** Shand Dam Monthly Precipitation 2019 to October 16, 2023



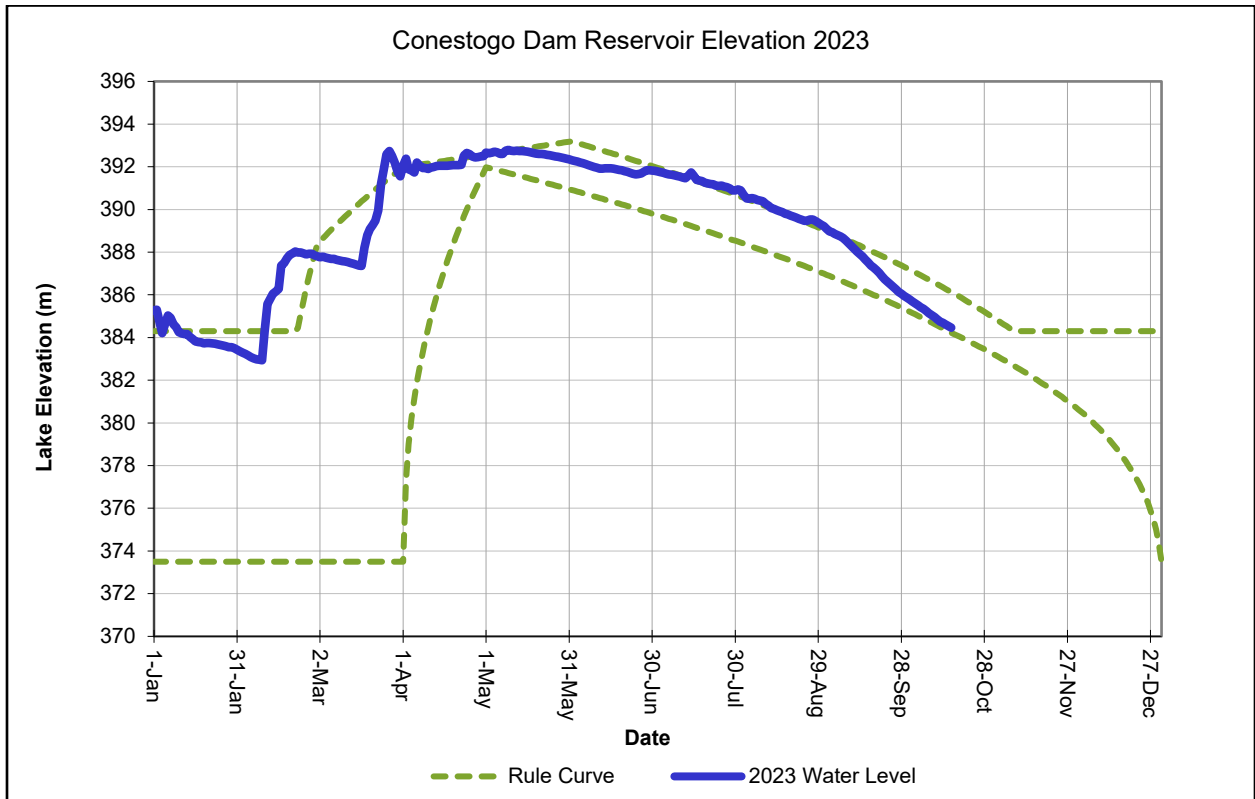
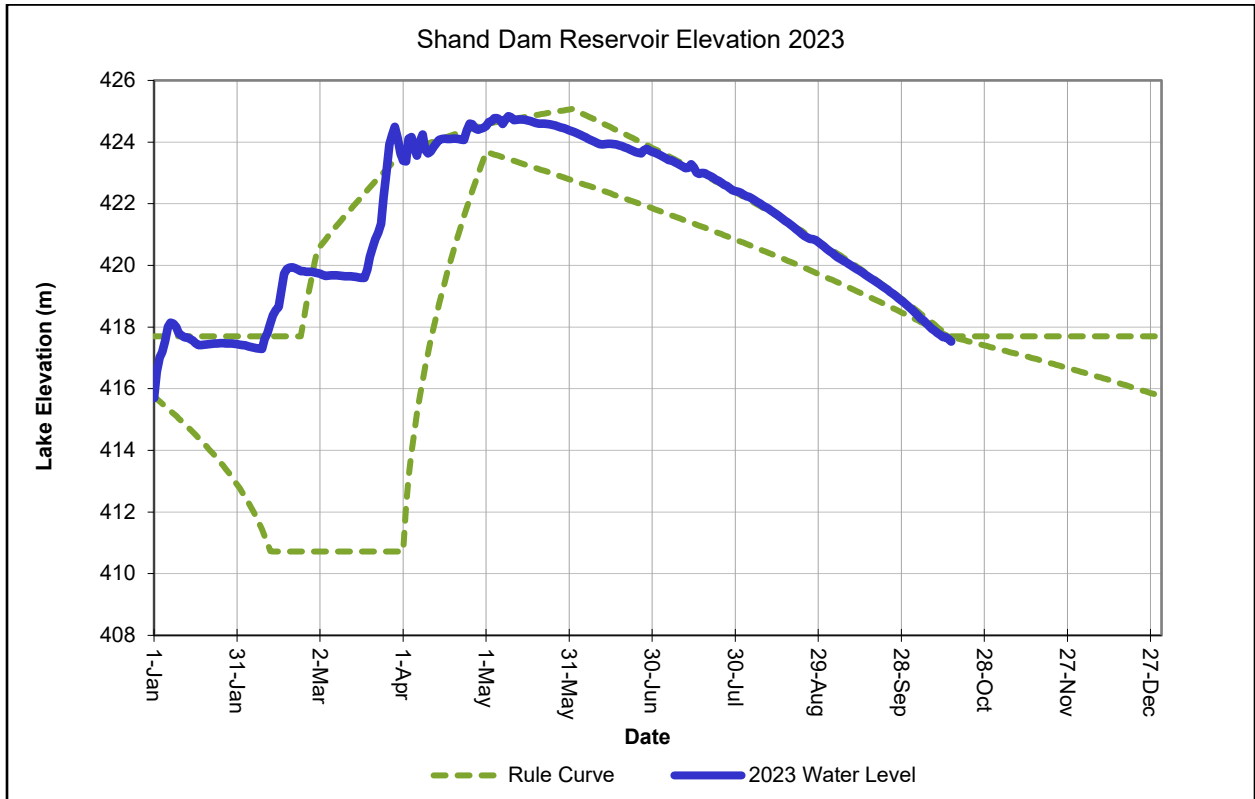
**Figure 2:** Monthly Average Air Temperatures at Shand Dam from 2019 to October 16, 2023



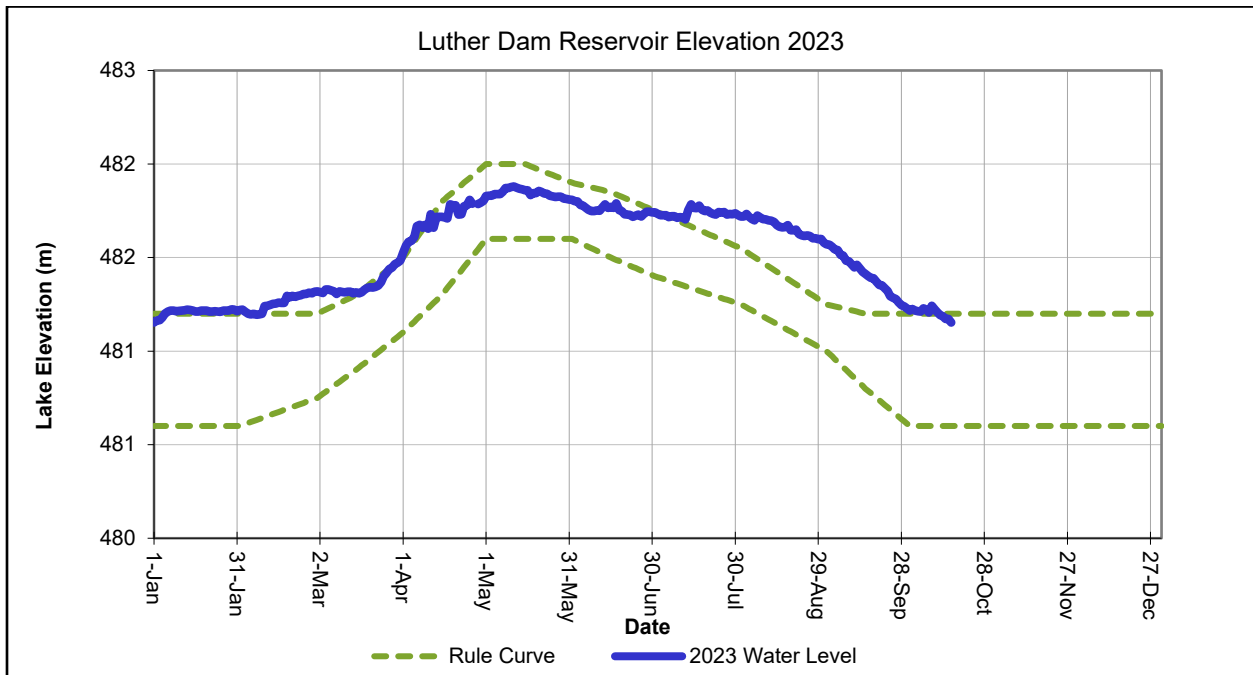
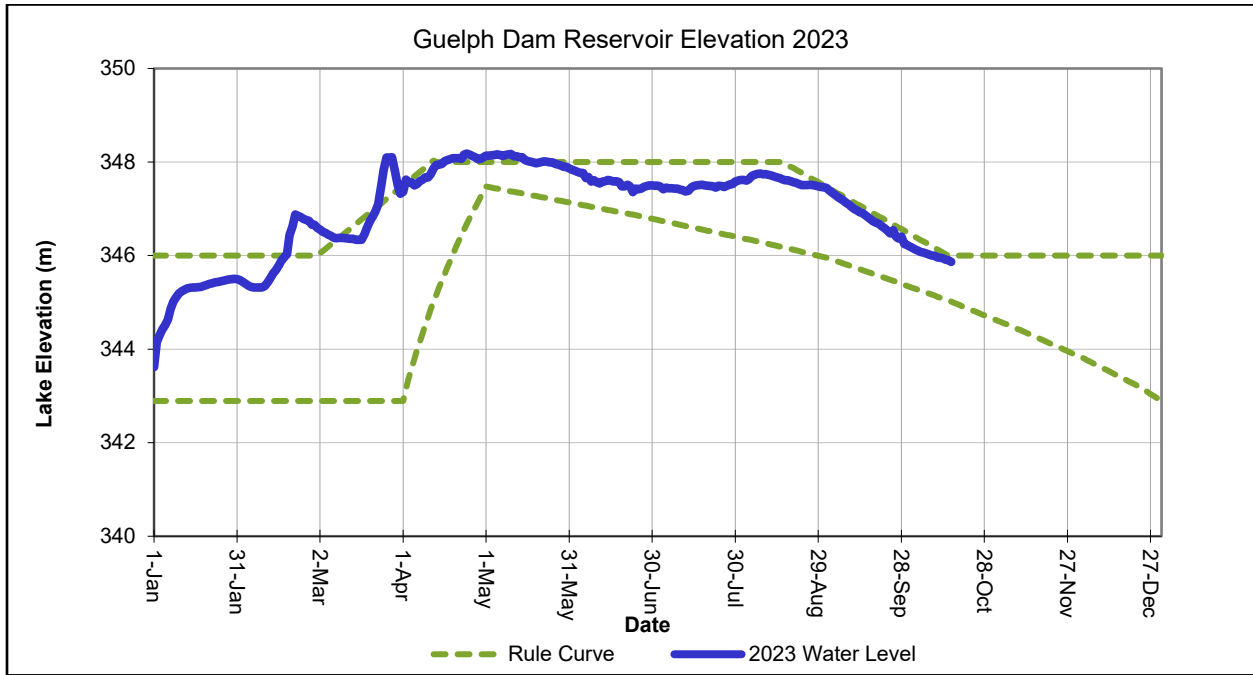
**Figure 3:** Water levels for Lake Erie at Port Colborne



**Figure 4:** Shand and Conestogo Reservoir Elevation Plots for 2023

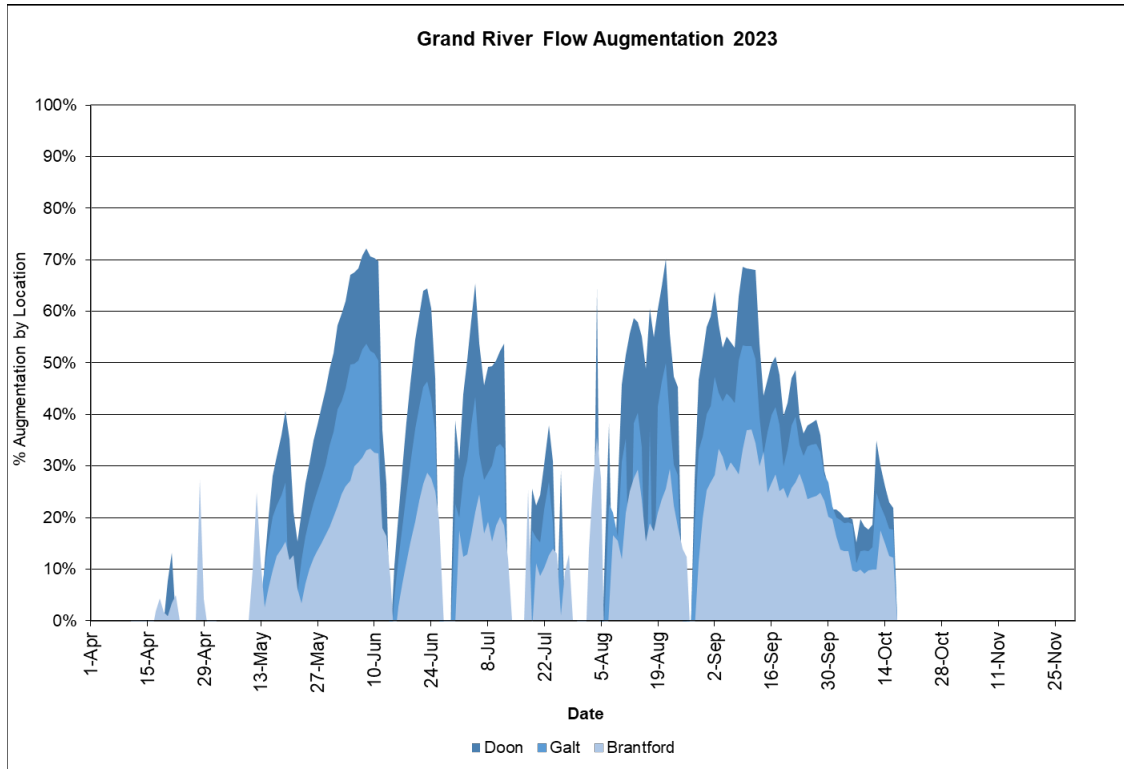


**Figure 5:** Guelph and Luther Reservoir Elevation Charts for 2023





**Figure 6:** Grand River augmentation Chart showing percent augmentation at Doon, Galt and Brantford for 2023



**Figure 7:** Speed River Flow Augmentation for 2023

