Grand River Conservation Authority

Report number: GM-11-21-78

Date: November 26, 2021

To: Members of the Grand River Conservation Authority

Subject: Current Watershed Conditions as of November 17, 2021

Recommendation:

THAT Report Number GM-11-21-78 – Current Watershed Conditions as of November 17, 2021 be received as information.

Summary:

October was a wet and very warm month across the watershed with the average monthly temperatures approximately 4 degrees above normal. The south was wettest with rainfall in the Brantford area approximately twice the long term average. The warm and wet conditions did not extend into November which has been much cooler and drier than October. Temperatures are close to the long term average with overnight lows often below freezing. Snow was recorded early in the month and the first snow survey of the year conducted on November 15th. Warm temperatures during that day keep the snow from building on the landscape.

Reservoir levels are stable moving into winter freeze up. The large reservoirs water levels are within their normal operating level with the exception of Luther which is slightly high due to ongoing maintenance. Lake Erie continues above the long term average and slightly below the level at this time last year.

The long term forecast is for near normal precipitation over the winter months. Forecasts for temperature are not consistent with both above and below normal temperatures predicted.

Report:

Precipitation

October was another wet month across the watershed. Although total precipitation was less than in September, all of the watershed rain gauges exceeded 90% of the long term average. The rain gauge at the Brantford Airport recorded the most precipitation with a total of 143.3mm, which is approximately twice the normal amount for October. Rainfall in October was spread throughout the month with no single large storms as was seen in September. Instead over half the days in the month had recordable precipitation.

Precipitation up to November 17th has been much lighter across the watershed than in previous months and shown in Table 1. Only the Brantford station has recorded near normal precipitation for the first half of the month. Other stations recorded between 44 and 66 percent of the long term average. November also saw the return of snow to the watershed with a small amount recorded at the northern stations early in the month and measurable snow recorded across the watershed on November 15th. The first snow survey of the year was conducted on November 15th, with inconsistent amounts of snow recorded at some of the snow survey sites. The snow survey is conducted every two weeks from November 15th to May 15th at set locations throughout the watershed to measure the amount and condition of the snow on the ground. The results inform reservoir operations and flood forecasting.

Table 1: Current monthly precipitation for climate stations across the watershed up to November 17, 2021 including the long term average precipitation for half of November.

Climate Station	Current Month Precipitation (mm)	Long Term Average Precipitation (mm)	Percentage of Long Term Average (%)
Shand	18.6	42.4	44%
Conestogo	28.1	47.6	59%
Guelph	15.0	40.2	37%
Luther	27.7	46.2	60%
Woolwich	18.1	34.8	52%
Laurel	27.4	41.8	66%
Shades	18.0	38.9	46%
Brantford	36.6	36.8	99%

Very high rainfall in September and October pushed the long term trends well above 100 percent over the last three months and are given in Table 2. The first five months of this year were fairly dry with overall precipitation below the long term average. The summer period was closer to the long term average and then the early fall was very wet. These wet conditions continue across the watershed with heavily saturated soils. A visual representation of these trends for the Shand climate station is also given in Figure 1.

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	118%	126%	104%	102%	102%
Conestogo	96%	134%	113%	96%	95%
Guelph	159%	140%	130%	111%	112%
Luther	94%	125%	107%	110%	107%
Woolwich	92%	116%	93%	92%	97%
Laurel	133%	174%	132%	102%	103%
Shades	159%	180%	146%	104%	109%
Brantford	206%	159%	123%	103%	108%

Air Temperatures

Since August, temperatures are much higher than the long term average. Over the past three months the average temperature is over 2 degrees above the long term average. October was especially warm with the average air temperature 4 degrees above normal. The first half of the month saw daytime temperatures above 20 degrees and overnight low temperatures in the mid-teens. The variability of monthly temperatures can be seen in Figure 2 for the Shand climate station.

Cooler and more seasonal temperatures returned in the first half of November bringing frost, freezing conditions and snow. In the northern parts of the watershed most days have recorded low temperatures below freezing, while the central and southern parts of the watershed have

about half of the month with low temperatures below freezing. Daytime high temperatures continue to be above freezing.

Lake Erie Water Levels

During October, the average lake level was approximately 0.56m above the long-term average, which was approximately 0.08m below the same month in 2020. In the first half of November, the average lake level was approximately 174.72m which is about 0.72m above the long-term average.

The long range forecast for Lake Erie, Figure 3, is for the lake level to decrease through to the end of the year. Lake levels are expected to stay below levels over the same period last year but well above the long term average. A High Lake Level Conditions Statements remains in effect.

Reservoir Conditions

With the exception of Luther, the large reservoirs are within their normal operating levels for this time of the year. The Luther reservoir is above its normal fall operating level due to ongoing maintenance work, but levels are well within an acceptable range for this reservoir.

The reservoirs will continue to be operated throughout the late fall to stabilize water levels before winter freeze up. 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 Canada is forecasting above normal temperatures and near normal precipitation for the November to January period. The Ministry of Natural Resources weather forecasters are predicting cooler temperatures and near normal precipitation for the winter period.

Flood Preparedness

Conditions are being monitored closely. Staff continue to hold weekly meetings as part of overall succession planning initiatives, dam operations and flood emergency preparedness.

A meeting is being organized for Thursday December 2nd with municipal flood coordinators, police and agency staff to update contact information and introduce new municipal flood coordinators, agency staff and GRCA staff to the GRCA flood warning system. A guest speaker Jenifier Boyer, the emergency management manager for Midland County Michigan, has agreed to deliver a presentation about the dam break emergencies in that county in May 2020 and their success of emergency management plans. Staff are also reaching out to the fire chief from the Township of North Dumfries to invite a presentation on the framework used to distribute flood messages township staff and politicians and to the public in that township.

Staff are receiving invitations to participate in emergency planning exercises over the fall. Participation in these sort of exercises is an important opportunity to explain the flood warning system to emergency response staff and improve overall preparedness for flood emergencies.

So far staff have participated in emergency preparedness exercises with the City of Guelph and Haldimand County. Lanxess a chemical manufacturer in Elmira is organizing an emergency planning exercise and will be inviting GRCA staff to participate. Staff have been invited to make a presentation to Haldimand County council regarding lakeshore flooding in recent years and the flood zone mapping developed to respond to lakeshore flooding.

Financial Implications:

Not applicable

Other Department Considerations:

Not applicable

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Figures:

Figure 1: Shand Dam Monthly Precipitation 2017 to November 17, 2021

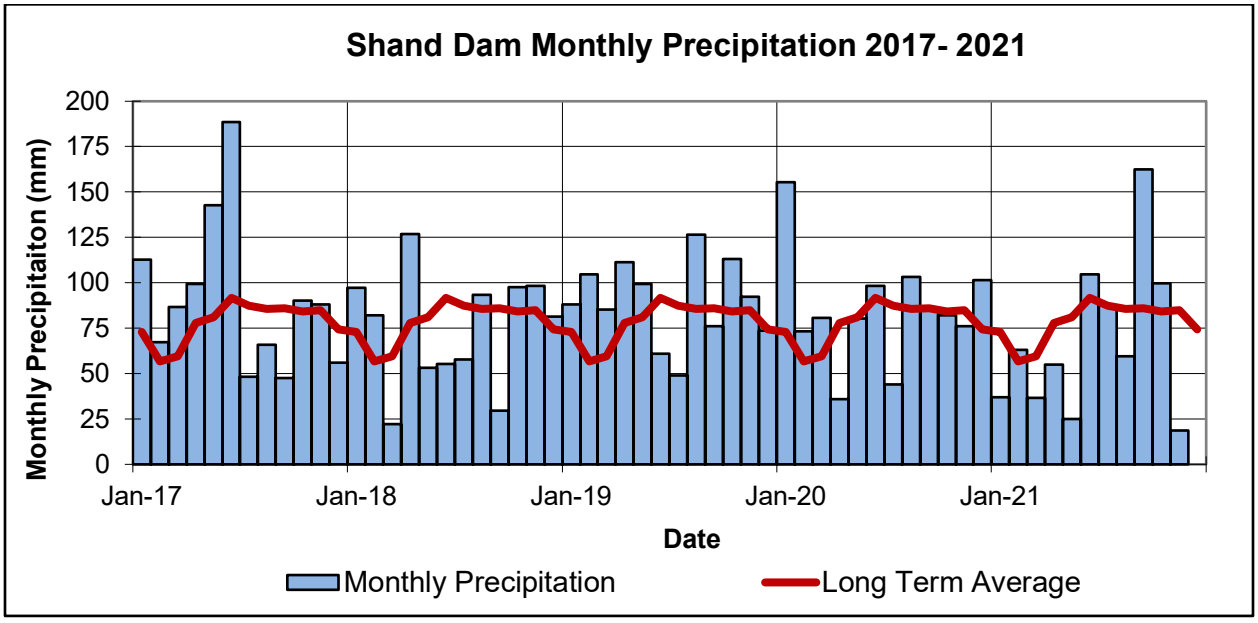


Figure 2: Monthly Average Air Temperatures at Shand Dam from 2017 to November 17, 2021

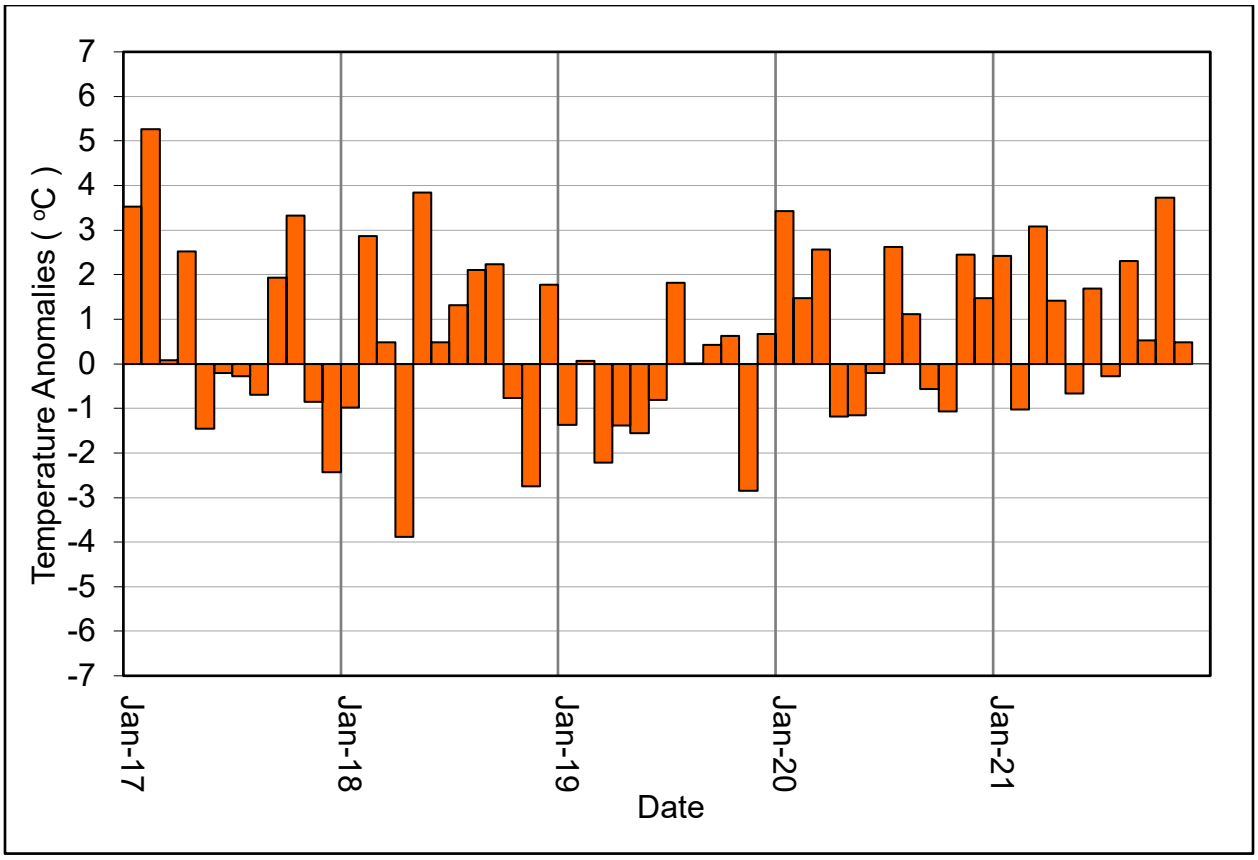


Figure 3: Water levels for Lake Erie at Port Colborne

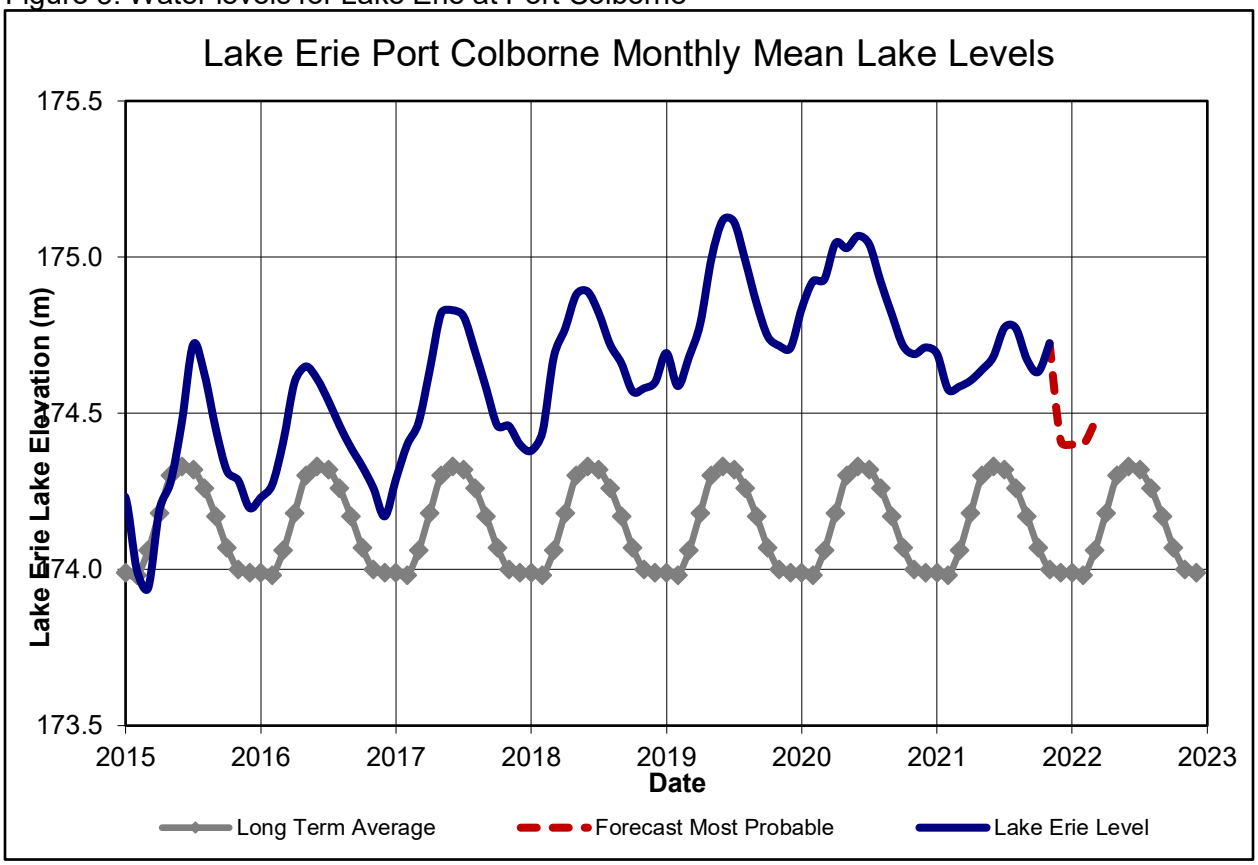
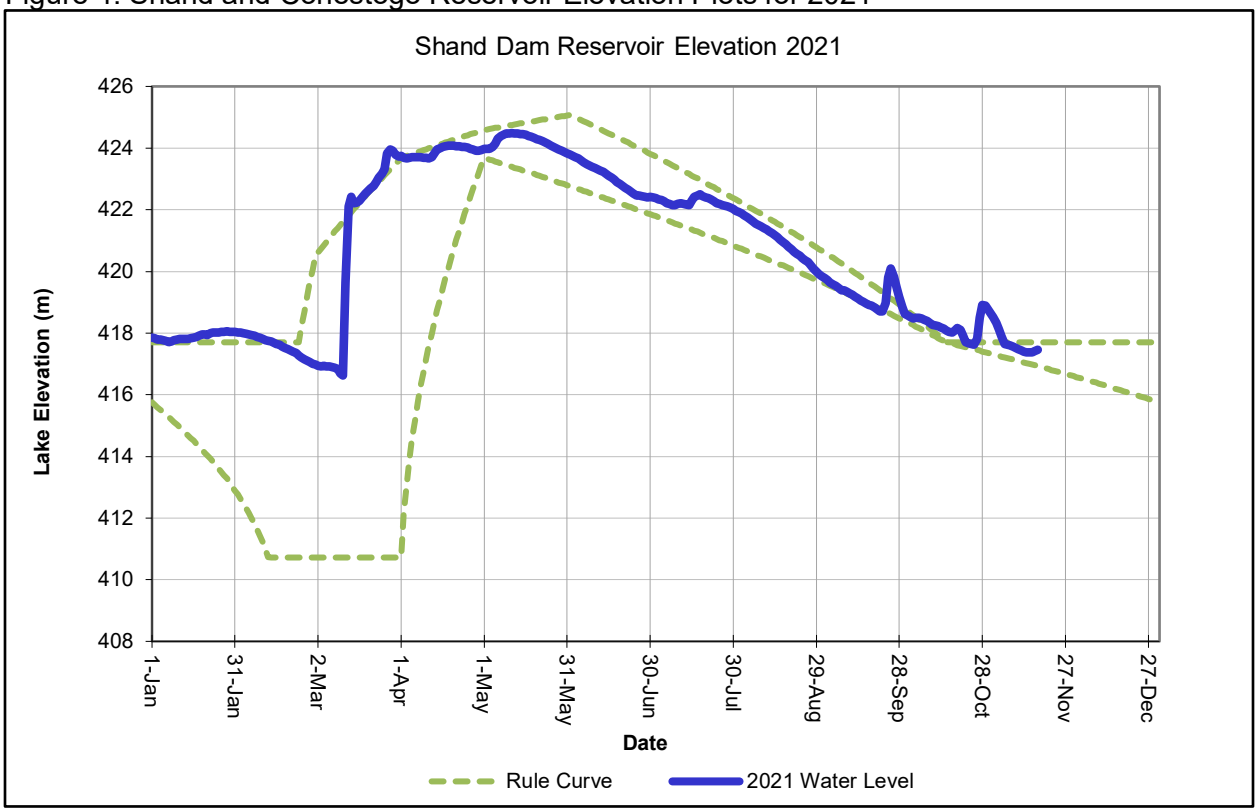


Figure 4: Shand and Conestogo Reservoir Elevation Plots for 2021



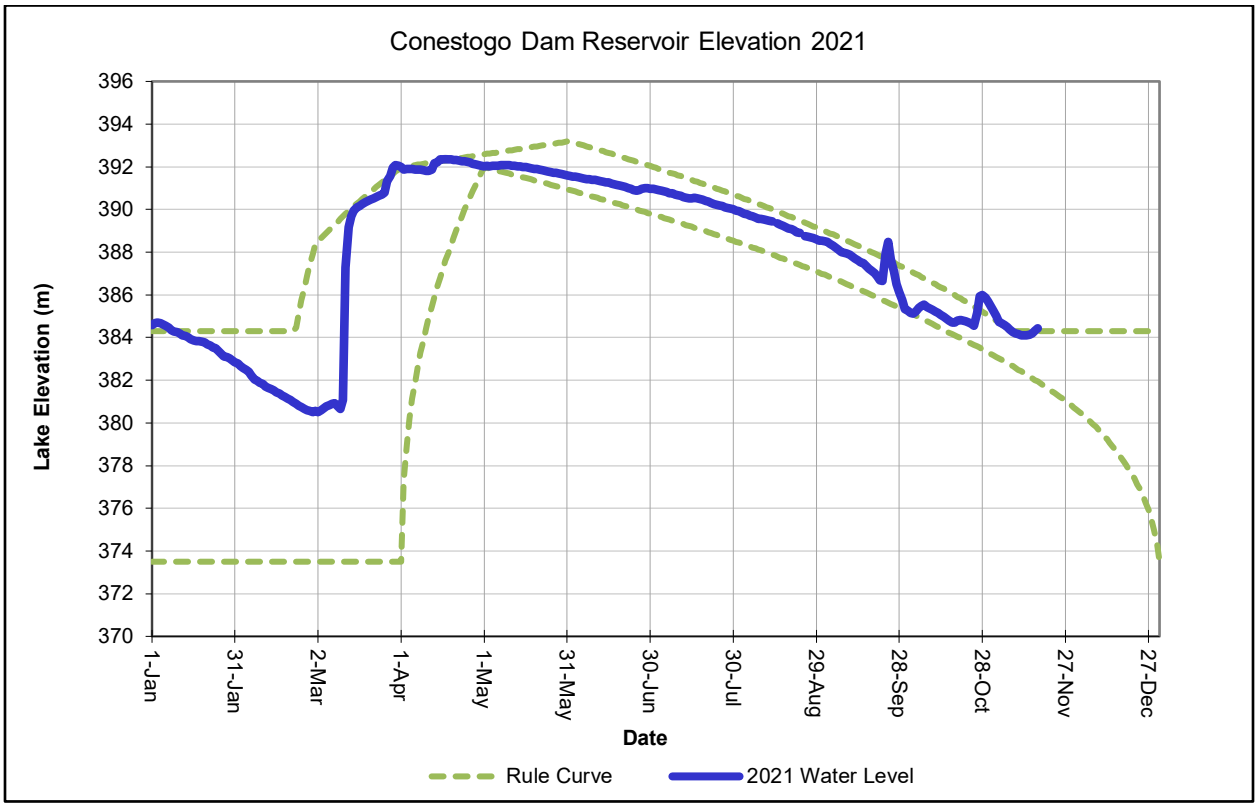


Figure 6: Guelph and Luther Reservoir Elevation Charts for 2021