

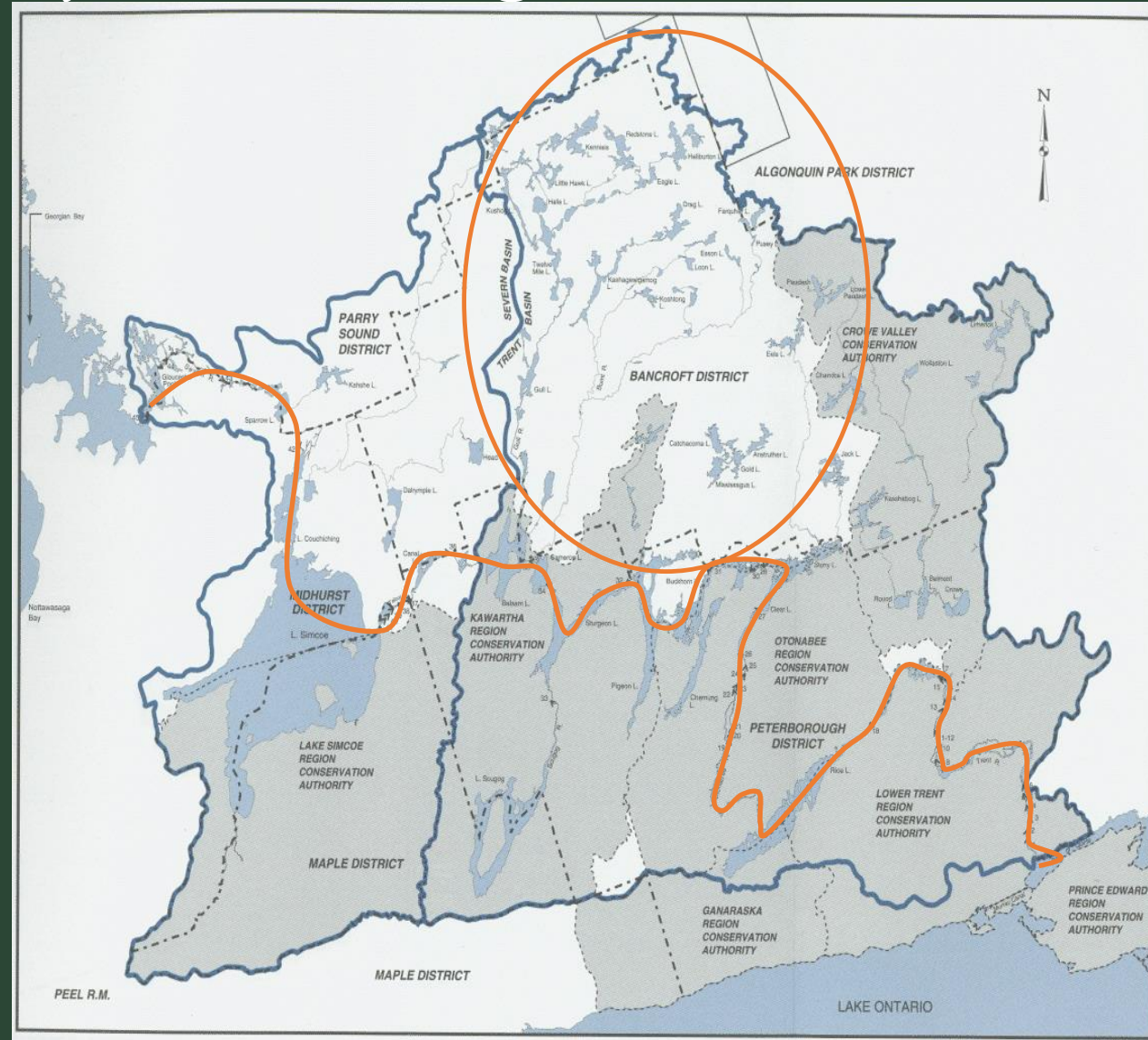
A CEWF Perspective on the Context for 2020 Water Management in the TSW Reservoirs

*Early snowmelt, Drought from April through Mid-July
with minimum flows, then significant rainfall.*

Ted Spence
*Chair CEWF and
Professor Emeritus in
Environmental Studies York U.*

Trent and Severn Watersheds

Waterway 386 kms long, 45 locks, and over 100 dams



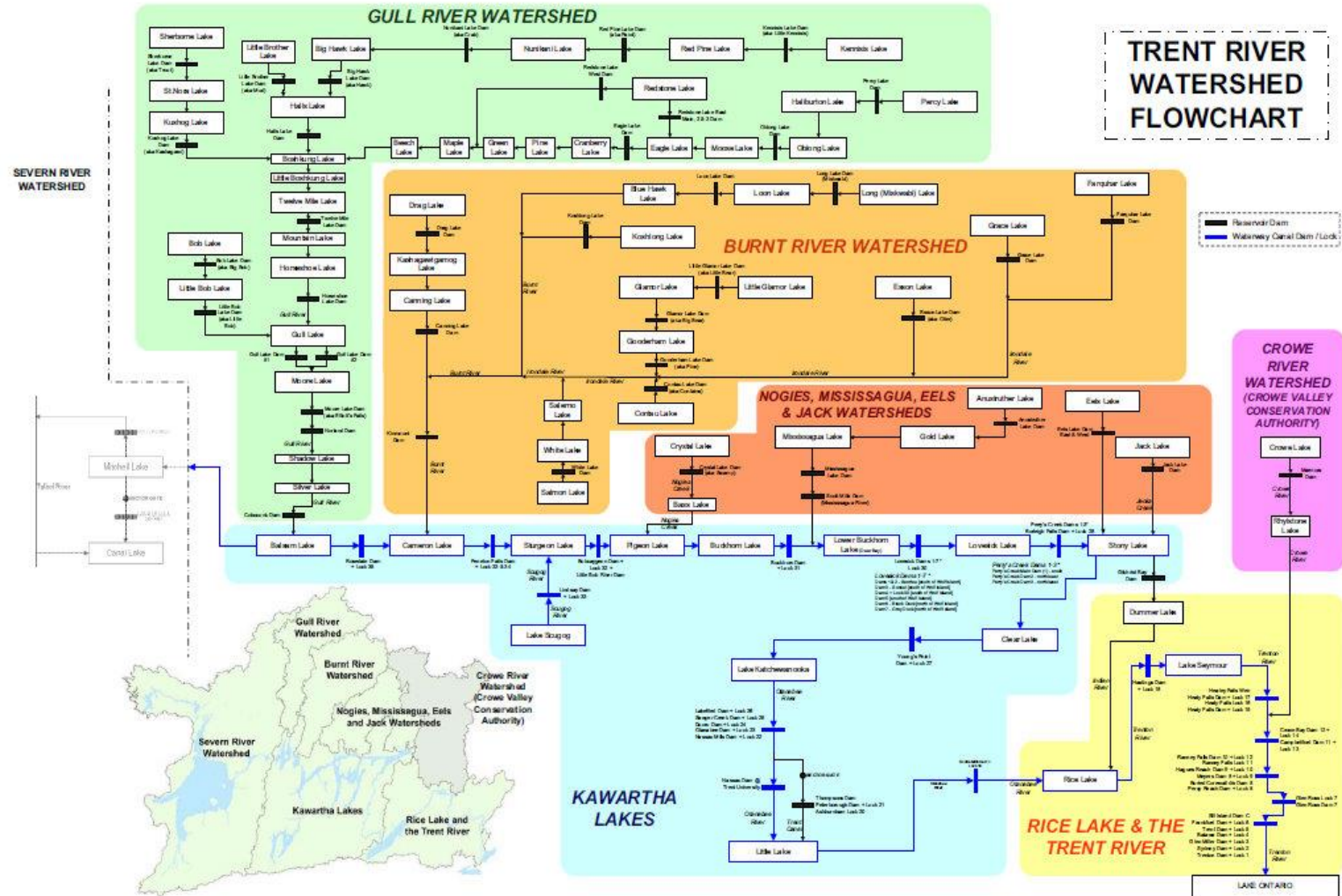
The Trent-Severn Watershed

(Source: Parks Canada Water Levels Website)



Trent River System Flow Chart

(Source: Parks Canada 2013)



Reservoir & Flow-Through (RAFT) Lakes

- In the “Haliburton Sector” (Haliburton County and northern Peterborough County) there are **35 reservoirs** –
 - **17 in the Gull River system (23,669 ha-m storage)**, three branches with multiple dams and complex flow patterns. Maple Lake chain significant uncontrolled drainage.
 - **13 in the Burnt River system (7,609 ha-m storage)**, soil drainage characteristics impact flow response. The lower 50%+ of basin has no significant control on flows.
 - **5 in the Central Lakes area (12,388 ha-m storage) including the Mississagua chain of lakes, Anstruther , Eels, Jack’s and Crystal lakes.** Relatively large reservoirs with 4 separate direct links to Canal lakes.

Water Management at the Watershed level

Key Water-Flow & -Level Constraints

- **TSW priorities public safety** (flood management and water supply) and **canal navigation**;
 - **Flood risk mitigation.**
 - **Minimum flow at Peterborough** for water supply and sewage treatment;
 - Maintaining the **Canal Regulations draught limits** is understood to govern the drawdown from the reservoirs;
 - While **maintaining reservoir levels** within historic norms
- **MNR Fisheries constraints** in spring (walleye) and fall (lake trout) based on limited data for many lakes;
- **The reservoirs are not a flood control system** particularly in late spring and early summer when reservoirs are normally near full!

In Recent Years TSW has taken Substantial Action To Make Water Management More Data and Analysis Driven

- Added 5 real-time snow gauges to augment snow survey readings
- Operate over 20 rain gauges with daily reporting
- Installed automatic level recorders on almost all reservoirs with more coming
- Monitor and analyse inflow/outflow water balances to understand storage
- Adopted a precipitation/runoff model to provide inflows to lakes based on forecast precipitation and snowmelt, and a routing model to forecast flows and water levels throughout the system
- On a daily basis data analysis leads to decisions on operations across the watershed.

Summary of Climate Change Implications for Water Management



Winter and Spring

- **Warmer winter temperatures and significant increase in winter precipitation including significant rain events** will lead to more runoff in winter and early spring, and the need to replace logs in winter to capture winter runoff to fill reservoirs.
- The “new normal” will be **higher risk of winter flooding**, earlier spring runoff with lower peak but possibly with ice on lakes.
- BUT **extreme spring rain events** like 2013, 2016, 2017 2018 and 2019 may lead to overfilled reservoirs and possible flooding with ice still in place as in recent experience.
- **Most immediate trend is more variability and extreme events including rainfall and drought conditions. Every year is different!**

Summary of Climate Change Implications for Water Management



Summer and Fall

- More of our rainfall will be in **more frequent major storm events and more frequent drought periods like in 2016, 2019 and 2020 possible.**
- With warmer summers like 2019 and 2020, higher temperatures will cause **more evaporation** from the large Kawartha Lakes and large reservoirs, and the demand for reservoir water may be greater.
- In prolonged **drought conditions**, minimum flow constraints and water conservation will be required across the entire Trent watershed.

Every Year Brings New and Different Challenges

Recent Experience

- In recent summers reservoir levels have been close to normal on most of our lakes but TSW has had to continuously adjust to and manage for extreme weather conditions each year. Often this has included water conservation with minimum flows downstream on Otonabee and Trent Rivers and periods of restricted flows on flow-through lakes and river sections
- **2013** April 15 to 19 rain on snow and frozen ground extreme flooding Minden.
- **2016** extreme rain and flooding in late March, then record setting drought May until mid August. Water conservation watershed wide.
- **2017** early snowmelt, extreme rain end of April early May, flooding and continuing excess rainfall with above normal levels all summer and into fall.
- **2018** extreme rain/snow/ice in April, followed by drought conditions and spotty rainfall through to end of July, with slow filling of some reservoirs and drawdown beginning in early July. Very wet August.
- **2019** Record snowpack and extreme spring rain but without serious flooding followed by drought but high levels and flows all summer.

2020 Winter/Spring Precipitation Haliburton

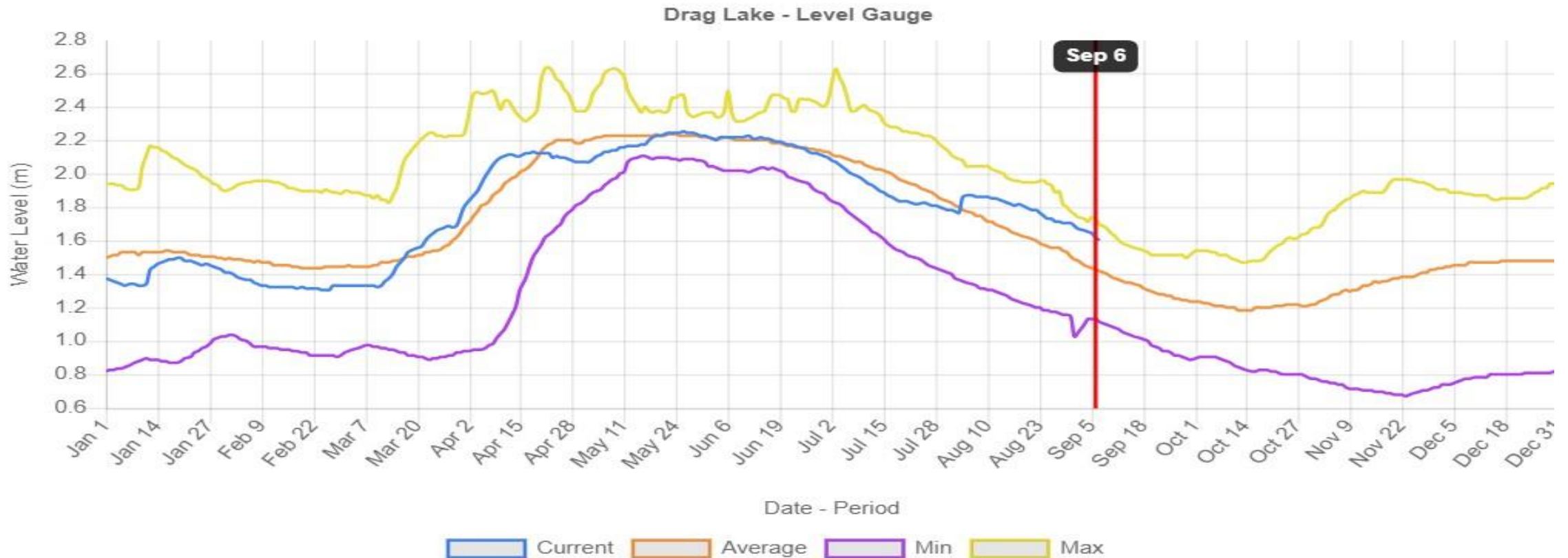
Month	Total PPTTE mms	Rain mms	Snow cms	Normal PPTTE	% of Normal	Snowpack end of month cms	Notes
2020 Jan	130	49	81	100	130%	38	Significant rainfall but snowpack still above normal level of 32 cms at month end
2020 Feb	60	0	60	73	82%	60	Normal snowpack end of month is 42 cms
2020 March	87	73.4	13	75	116%	5	Normal end of month snowpack 16 cms
2020 April	75	44	31	76	99%	0	very dry month with 18 mm rainfall on the 29th and 30th
2020 May	68	54	13	93	73%		Very dry month
2020 June	58	58	0	81	72%		Another dry month
2020 July	96.9	96.9	0	90	108%		Only 6.1mm from 1st to 16 in drought conditions then 90 mm from 17 to 31st
2020 Aug	229	229	0	79	290%		131 mm in first 5 days of month with total 290% of normal

2020 Watershed Wide Water Management

- **End of March-** early snowmelt and strategy - fill reservoirs and Kawartha lakes to only 90% to mitigate Extreme spring rainfall events and flooding.
- **April through June-** drought conditions, minimum flow on Gull, Burnt and Otonabee R and throughout reservoirs as levels rose to near normal but low flows in Flow through lakes and rivers.
- **Early July-** high evaporation rates on Kawarthas and drought continues, require reservoir drawdown below normal levels.
- **July 17 and 20-** widespread significant rainfall, dams adjusted to raise levels closer to normal but restricted downstream flows then return to drawdown.
- **August-** lots of rain early and dams adjusted to raise levels to normal, restricted flows and now levels at or above normal range.

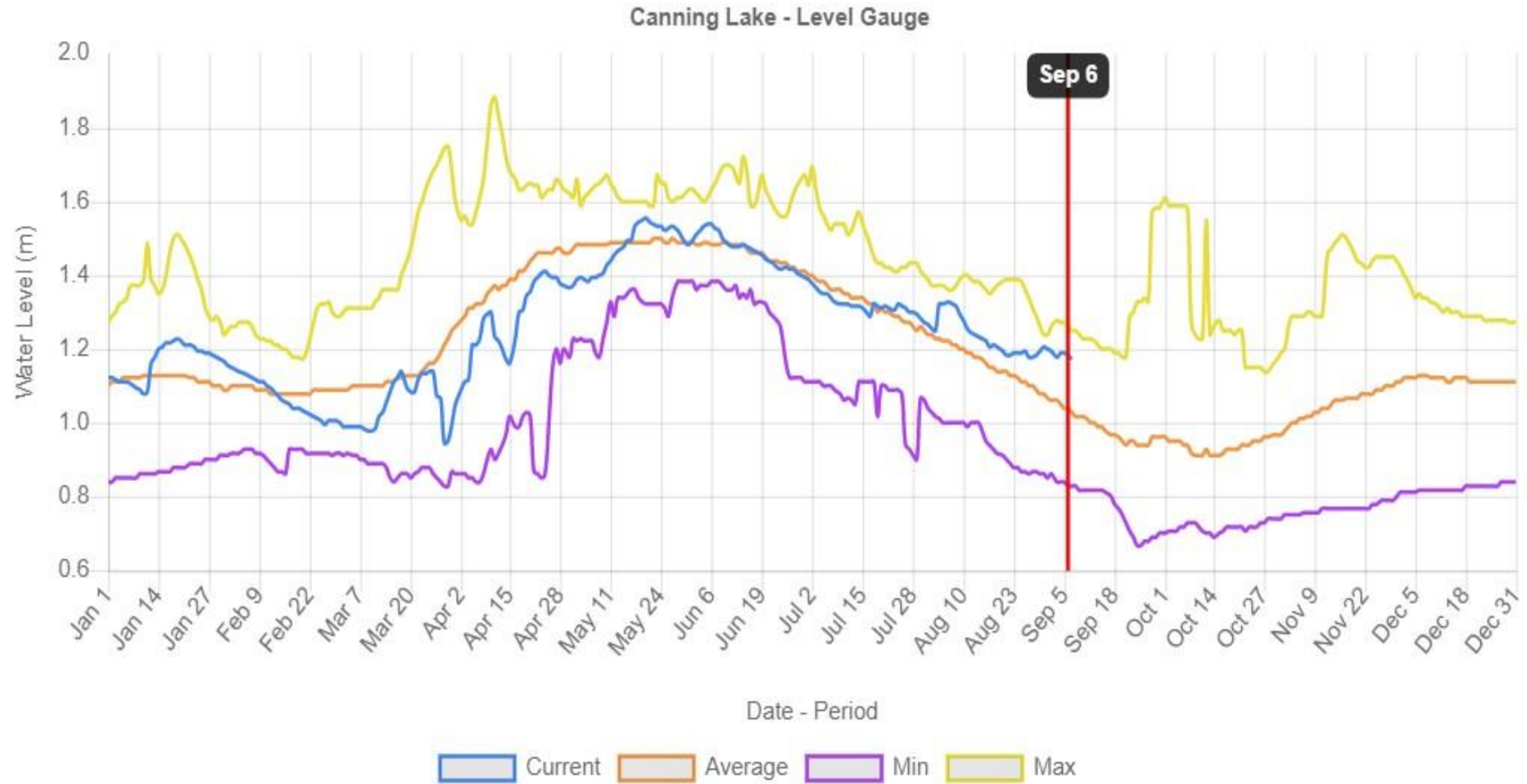
Drag Lake Water Levels 2020

Hold at 90% with snowmelt, normal level by May 24, drawdown below normal in July, rainfall in Mid July stabilized level, August rain above normal levels.



Last Updated: Sep 6, 2020

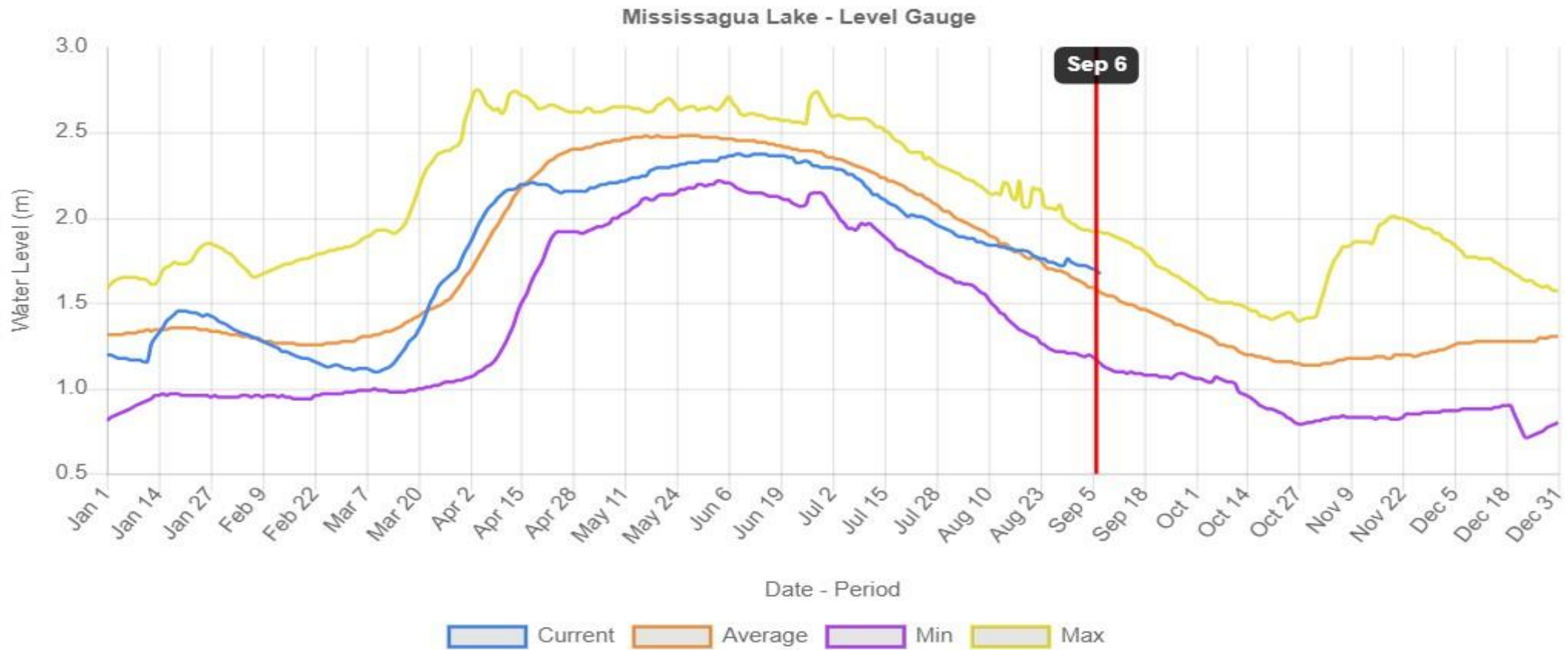
2020 Canning Lake Levels



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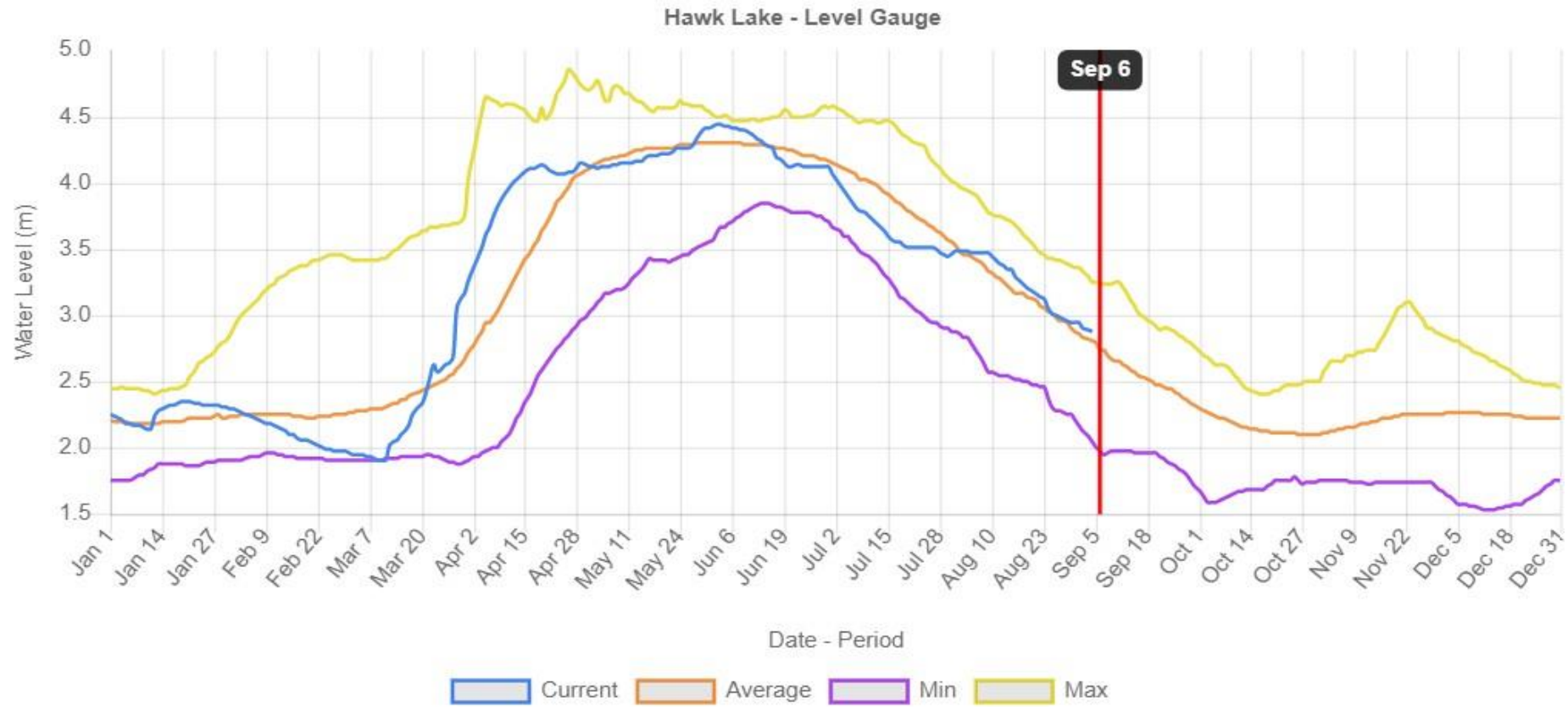
Mississauga Lake Levels 2020

90% full early April, drought meant slow filling with normal level not reached until Mid August



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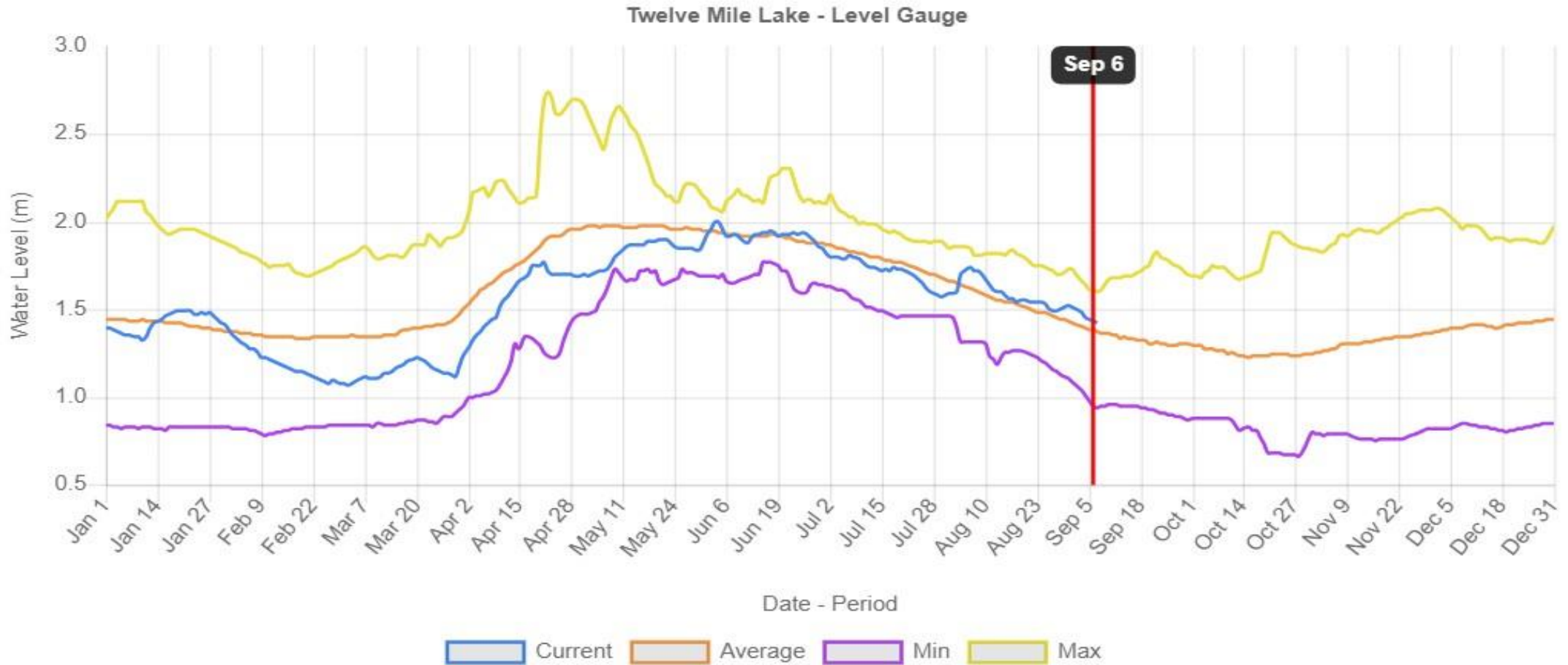
2020 Hawk Lake Levels



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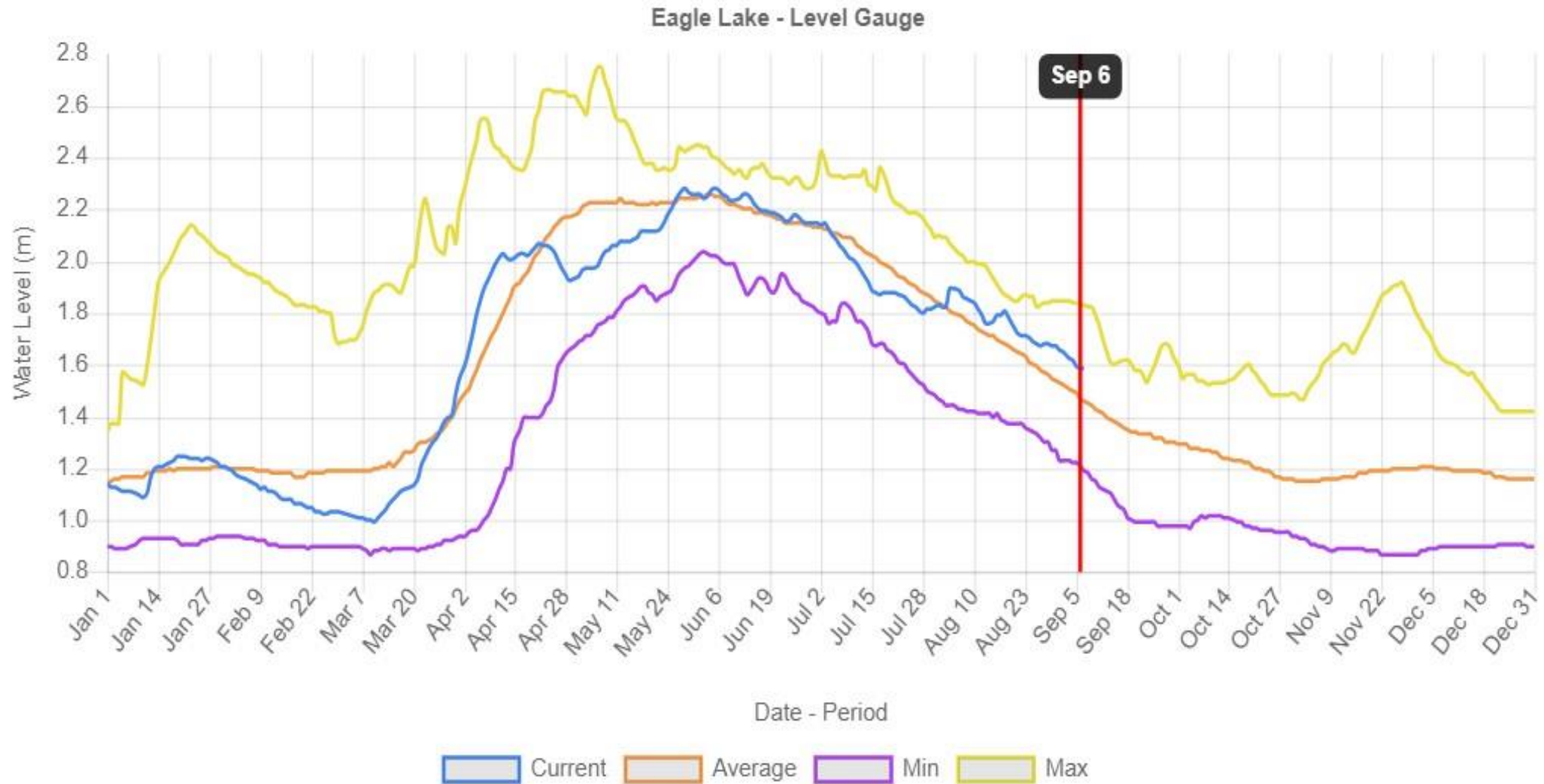
Twelve Mile Lake Levels 2020

Complex Water management where the three branches of the Gull River meet



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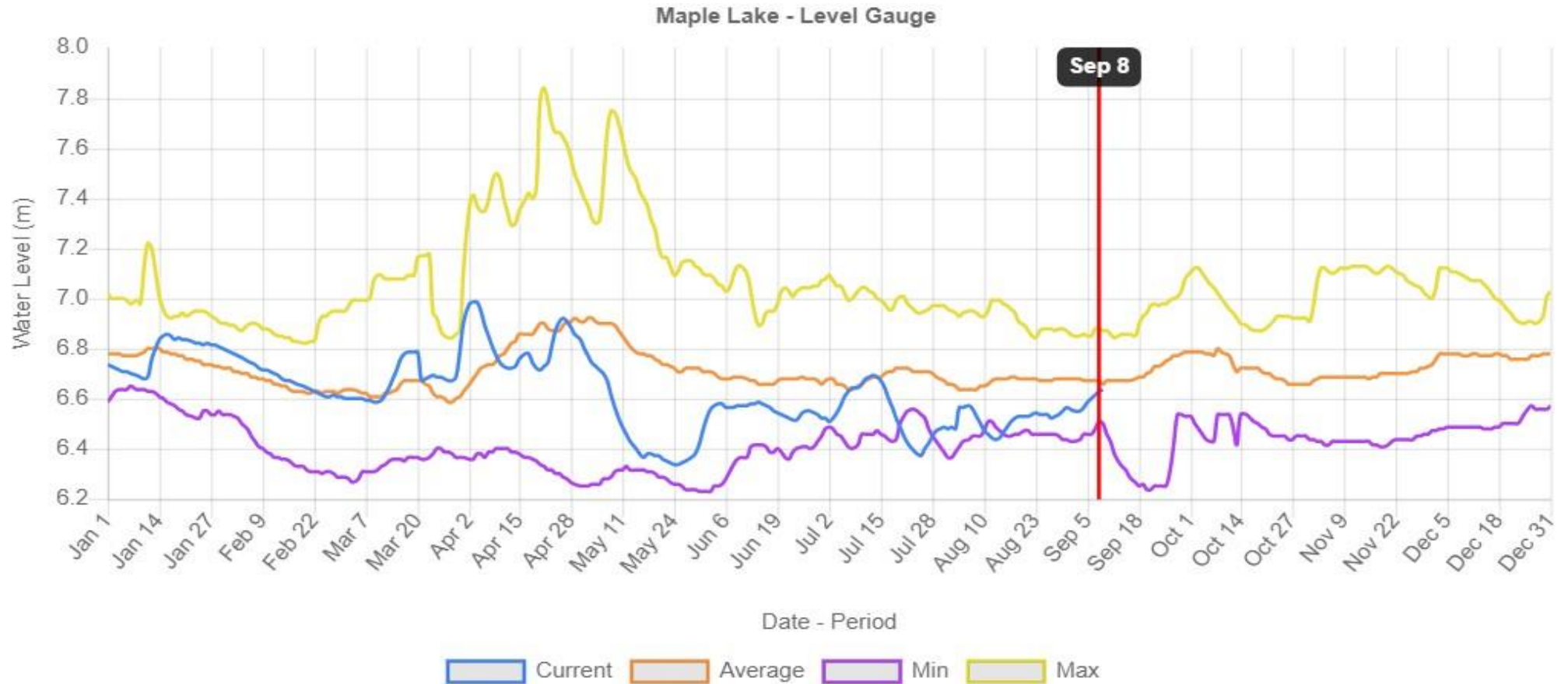
Eagle Lake Levels 2020



Last Updated: Sep 6, 2020

Maple Lake Levels 2020

Flow through lake chain with reduced flow when reservoirs were being filled and maintained in May and June, in late July, and through August



Last Updated: Sep 8, 2020

CEWF.Ca Links to Current Level graphs and tables, Historic water levels, TSW Water Management Updates and Drawdown forecasts

Coalition for Equitable Water Flow



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Background

[CEWF 2019 Priorities](#)

[Who We Are](#)

Member Communications

[2019 ACM](#)

[2018 AGM](#)

[2017 AGM Slides](#)

[2016 AGM - Summary](#)

[2016 AGM Slides](#)

Average Climate Data 1981-2010

[Haliburton](#)

September 09, 2020

→ Water Level Forecast Sept 9/20

Significant Drawdown of the reservoirs is continuing with 13 of our reservoir lakes forecast to drop more than 20 cms over next two weeks. Over the next five weeks TSW will be bringing all reservoirs down to their winter levels in order to accommodate the lake trout spawning which occurs in the last half of October. All residents can monitor these drawdown forecasts as well as the water level graphs and tables on the TSW website (see below) to ensure you know what to expect in terms of level changes.

To view the TSW water level forecast for the period September 8-22 - [click here](#)

To view the TSW Water Level website - [click here](#)

To view the TSW Drawdown website - [click here](#)

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August 25, 2020

→ Water Level Forecast & Water Management Update - Aug 25/20

To view the **TSW two week forecast** covering the period August 21 - September 4, 2020 - [click here](#)

TSW Water Management Update - Aug 24/20

[Weather](#)

[Mail](#)

TSW Water Levels

[TSW Water Levels Website](#)
[2019 Water Levels Summary](#)
[2018 Water Levels Summary](#)
[2017 Water Levels Summary](#)
[Historical Data \(1988-2013\)](#)
[Lake Level Ranges](#)
[2016 Water Levels Summary](#)
[2015 Water Levels Summary](#)
[2014 Water Levels Summary](#)
[2013 Water Levels Summary](#)

Important Links

[TSW Home Page](#)
[TSW Water Management Updates](#)
[MNR Flood Alerts](#)
[How the Water is Managed](#)
[It's All About The Water](#)

Reference Material

[Panel on the Future of the TSW - 'It's All About The Water' \(2008\)](#)
[AECOM Water Management Study - Part 1](#)
[AECOM Water Management Study - Part 2](#)
[AECOM Water Management Study - Part 3](#)
[AECOM Water Management Study - Part 4](#)
[AECOM Full 2013 Flood Report Preferred Water Levels - Part A](#)
[Preferred Water Levels - Part B](#)
[AECOM Summary Water](#)