Coalition for Equitable Water Flow

The Coalition for Equitable Water Flow, the Trent-Severn Waterway, and Bob Lake Water Management

Presentation to the Bob Lake Property Owners Association
May 18, 2019

Bruce McClennan – Gull Lake

CEWF Vice-Chair

Cewfca@gmail.com **cewf.ca**

Presentation Overview

Coalition for Equitable Water Flow

- What is CEWF and an Overview of the Trent-Severn Waterway (TSW).
- Water level and flow variability in recent years in the TSW reservoir area with focus on Bob Lake.
- Climate change projections for the TSW.
- TSW approach to Climate Change and what you should be thinking about.

CEWF Background

Coalition for Equitable Water Flow

- A Volunteer Organization established in 2006 to provide input to - **Panel on the Future of the Trent Severn Waterway** (2007)
- Aims to represent the interests of more than 30,000 waterfront property owners on **"Reservoir" and "Flow-Through" (RaFT)** lakes in Haliburton and Northern Peterborough Counties
- **32 Member Lake Associations** representing 91% of the TSW's reservoir lake storage capacity (reservoirs with no association = 3%)
- Sub-watersheds included:
  - **Gull, Burnt & Mississagua Rivers plus Nogies, Eels & Jack's Creeks**
- In 2016 entered a new partnership with 6 local municipalities in Haliburton and Peterborough Counties, **the Upper Trent Water Management Partnership (UTWMP).**

Member Lake Associations

Represents 91% of Reservoir Capacity: 3% no known LA

Coalition for Equitable Water Flow

- Anstruther
- Big Bob (South)
- Canning
- Cavendish Ratepayers (Mississagua, Catchacoma et al)
- Crystal
- Drag & Spruce
- Eels
- Esson – Rowbotham Rd
- Fortescue
- Glamor
- Grace
- Gull
- Haliburton
- Halls & Hawk (Big & Little)
- Horseshoe
- Jack's
- Kashagawigamog
- Kennisis
- Koshlong
- Kushog
- Little Glamor
- Loon
- Maple/Beech/Cameron
- Miskwabi
- Moore
- Mountain
- Percy
- Redstone
- Salerno/Devil's
- Soyers
- Twelve Mile/Little Boshkung
- White

CEWF Objectives

Coalition for Equitable Water Flow

- To promote an **Integrated Approach to Water Management at the Watershed Level**
- To maintain **dialogue with TSW management**
- To promote **shared information and understanding of Water Management issues/practices**
- To promote **approaches to ensure safe navigation, access to waterfront property, economic sustainability and the avoidance of negative environmental and economic impacts for residents on the Reservoir and Flow Through (RAFT) lakes.**

The Trent Watershed & the Trent-Severn Waterway

Coalition for Equitable Water Flow

- Trent River watershed is the largest in Southern Ontario with drainage area of 12,530 sq. km. covering 3 sub-watersheds.
  - The Haliburton Sector Reservoir Lakes – (3,320 sq. km.)
  - The Kawartha Lakes & Otonabee River - (4,862 sq. km.)
  - Rice Lake, the Trent River & Crowe River – (4,348 sq. km.)
- Main feature of the watershed is the Trent-Severn Waterway which stretches 386 km from Georgian Bay to Lake Ontario and includes 45 locks from #1 Trenton to #45 Port Severn.

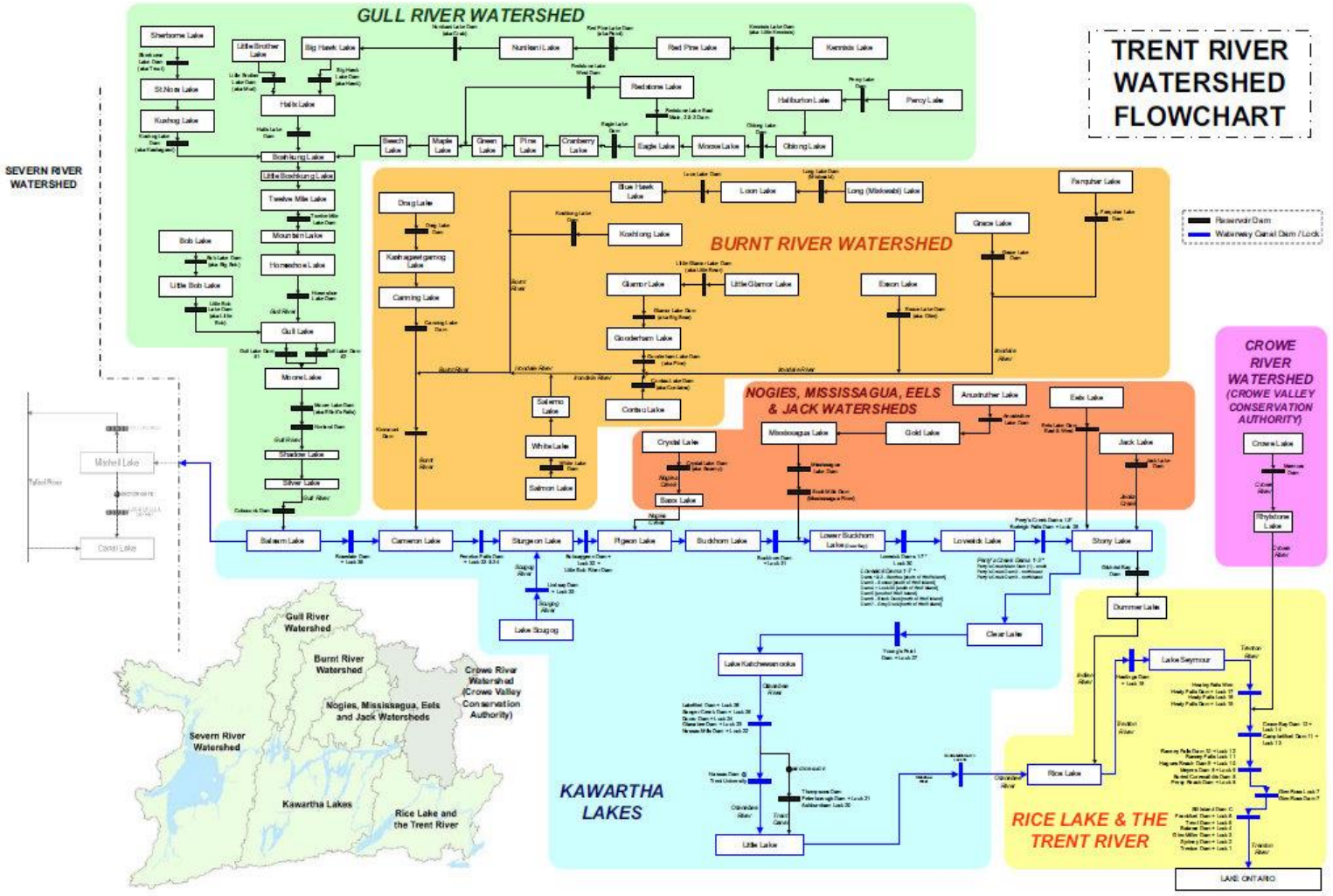
The Trent-Severn Watershed

(Source: Parks Canada Water Levels Website)

Coalition for Equitable Water Flow

Trent River System Flow Chart

(Source: Parks Canada 2013)



Reservoir & Flow-Through (RAFT) Lakes

Coalition for Equitable Water Flow

- 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),**
  - **13 in the Burnt River System (7609 ha-m storage), and**
  - **5 in the Central Lakes area (12,388 ha-m storage) including the Mississagua chain of lakes, Anstruther , Eels, Jacks and Crystal lakes.**
- The reservoir seasonal water level changes of up to 10 feet (3.4 m) combined with severe flow constraints at some points downstream (e.g. Minden, Peterborough)
- There are also challenges to maintaining navigable water levels on connecting rivers and flow-through lakes and minimum flows and levels for fisheries management.

Key Water-Flow & -Level Constraints

Coalition for Equitable Water Flow

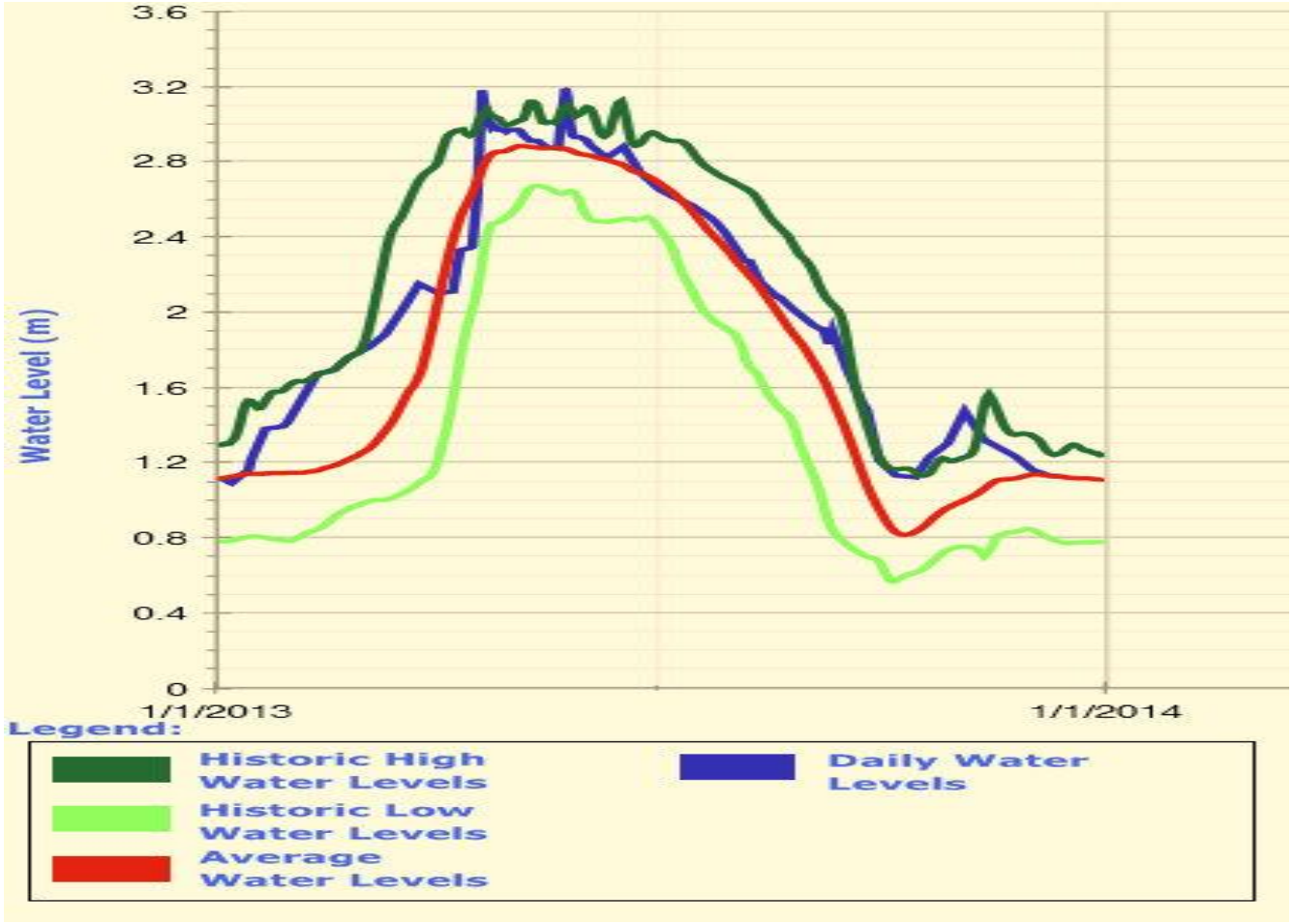
- **TSW priorities public safety** (flood management and water supply) **and canal navigation;**
- **Minimum flow at Peterborough** for water supply and sewage treatment;
- Maintaining the **Canal Regulations draught limits** is understood to govern the drawdown from the reservoirs;
- While **maintaining 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!

2013 Was a year of Extreme Rainfall Events Spring and Fall

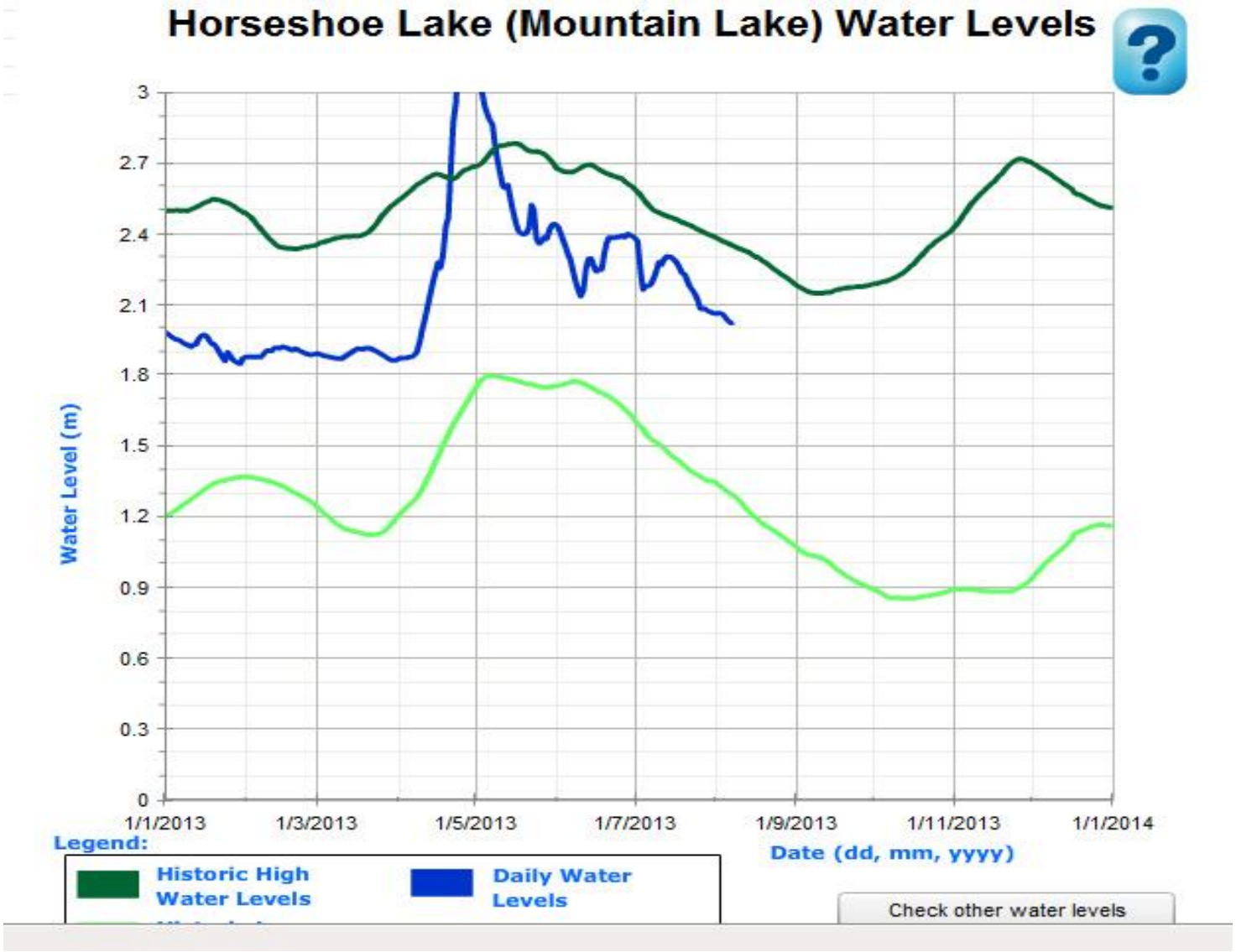
- Early April reservoirs filling and at near normal levels and then 2 extreme rainfall events!!!
- **April 17, 18 and 19** – about 1 inch of rain central lakes but up to **3 inches over Haliburton on to still frozen ground** caused extreme flooding on some reservoirs in Gull and Burnt River systems and in Minden.
- **May 20, 21 and 22** – more than 1 inch of rain in central lakes and again **3 inches over Haliburton** causing more high levels on reservoirs but controlled flows and minimal flooding.
- **October** had double normal rainfall resulting in seasonal record high water levels on many reservoirs.

Big Bob Lake Water Levels 2013

Record highs in April, May and in November



2013


Horseshoe Lake (Mountain Lake) Water Levels
Water Level (m)
3
2.7
2.4
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0
1/1/2013
1/3/2013
1/5/2013
1/7/2013
1/9/2013
1/11/2013
1/1/2014
Date (dd, mm, yyyy)
Legend:
Historic High Water Levels
Daily Water Levels
Check other water levels

Minden Flooding April 2013

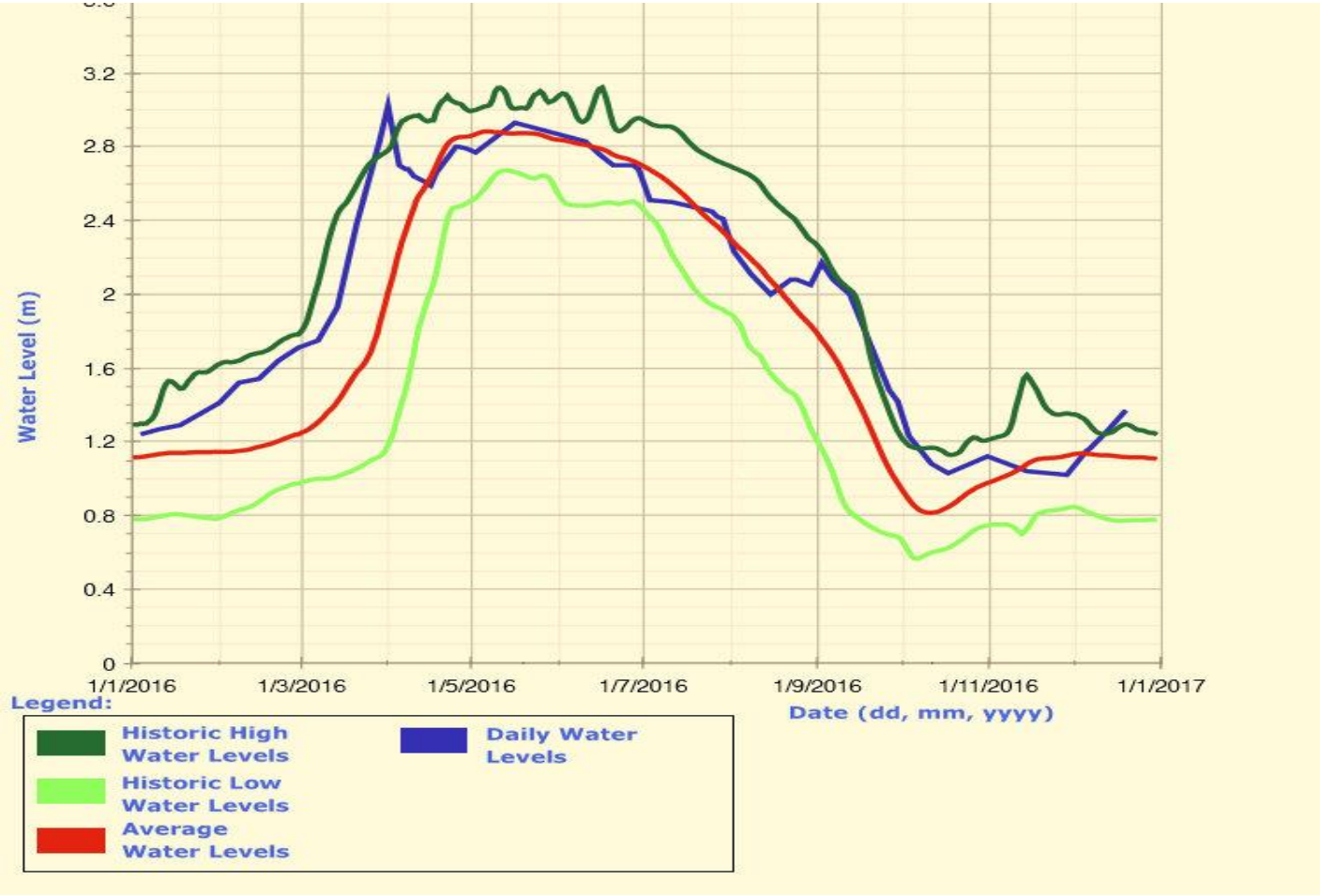
Spring 2016 Water Levels

Coalition for Equitable Water Flow

- Relatively warm Winter with less snow than normal and early runoff. We welcomed TSW actions to partially fill reservoirs beginning in early March.
- BUT - March precipitation at Haliburton was 171mm or 238% of the normal 72mm, and 97mm fell in last 8 days of the month with some areas getting 125mm.
- The result was lake levels reached record or near record highs with ice on the lakes. But Minden was not flooded as in 2013.
- Communications from MNRF, TSW and Municipalities much better than in 2013 and reposted by CEWF.
- Remember - the reservoirs are not a flood control system and almost no system can handle 97 to 125 mm of rain in 8 days.

Big Bob Lake Levels 2016

Extreme Rain March, Extreme Drought May to August, High Levels Aug./Sept, Drought Returns, Outstanding Water Management



Spring and Summer 2016
Drought over the Trent Basin

Coalition for Equitable Water Flow

Precipitation Totals May to August

May 1 to August 12

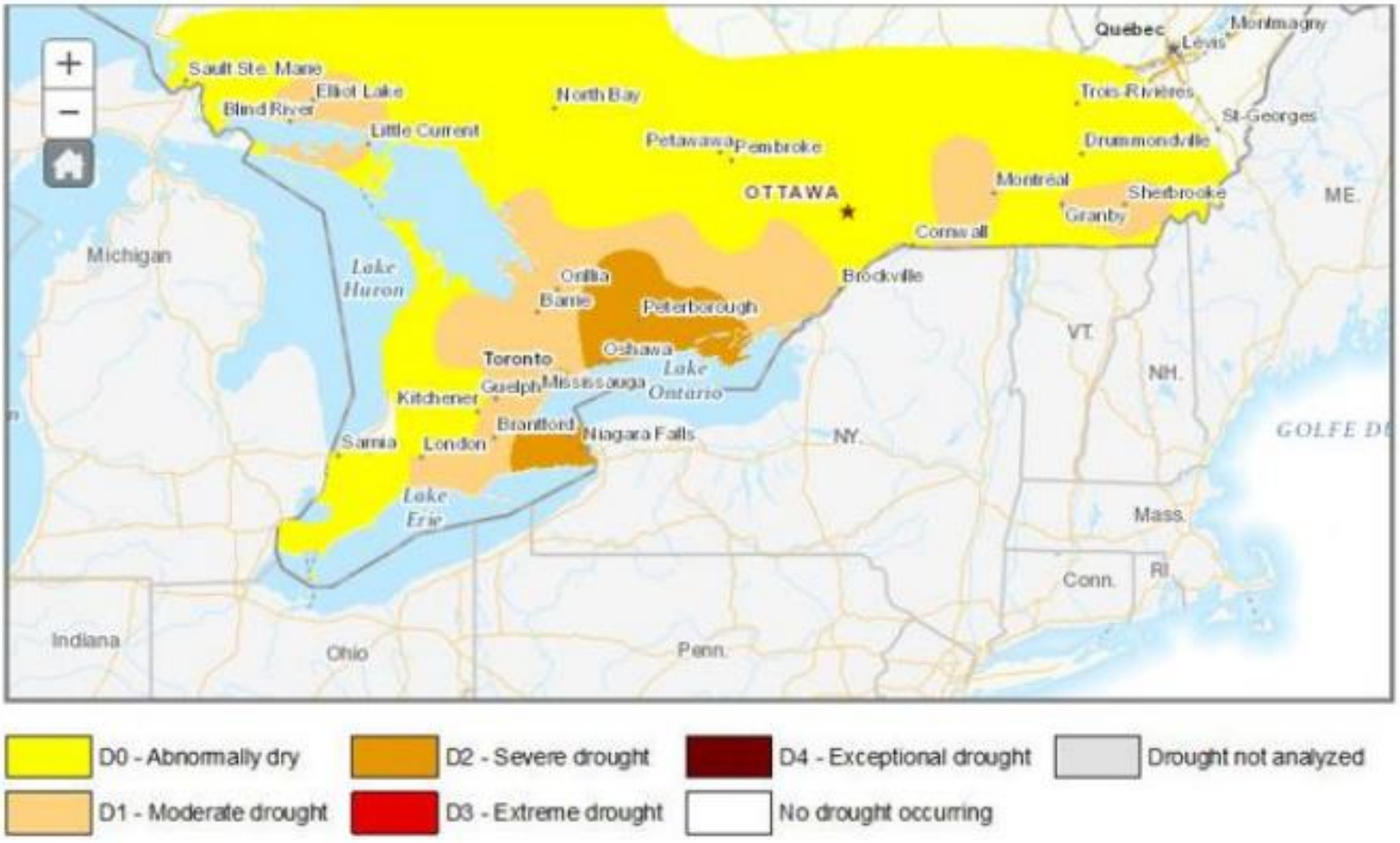
Precipitation Station	Normal mm	Actual mm	Difference from Normal mm	Actual as % of Normal
Trenton	262.8	106.4	-156.4	40%
Peterborough	270.5	83.5	-187.0	31%
Haliburton	304.1	178.2	-125.9	59%

May 1 to August 31

Precipitation Station	Normal mm	Actual mm	Difference from Normal mm	Actual as % of Normal
Trenton	298.9	200.6	-98.3	67%
Peterborough	309.0	122.1	-186.9	40%
Haliburton	343.6	338.6	-5.0	99%

The Weather Network Drought Analysis May 1 to August 10, 2016

Coalition for Equitable Water Flow

- 

Integrated Water Management in Drought Conditions 2016

Coalition for Equitable Water Flow

The TSW strategy avoided potentially record low reservoir levels and masked the drought for many on the TSW

- High Spring reservoir levels keeping extra storage allowed for normal or near normal water levels on most reservoirs through July.
- Based on long range forecasts, TSW also maintained storage in all major lakes on the Waterway (Kawarthas and Rice Lake) with minimum flows on Otonabee and Trent Rivers.
- Lack of rain and minimum flows on the Gull and Burnt systems drained levels and resulted in lower levels than on the Central Lakes.
- Draw down for the Waterway began in June but extreme draw was not forecast until August 8.
- Then the rains came. >150 mm at Haliburton in last 2 weeks of August.

2016-2017 Winter/Spring Precipitation Haliburton

Coalition for Equitable Water Flow

Month	Ppte Total mms	Rain mms	Snow cms	Normal Monthly Total mms	Actual as % of Normal
2016 Nov.	53	42	10	116	46%
2016 Dec.	153	19	134	87	176%
2017 Jan.	82	29	53	100	82%
2017 Feb.	100	45	55	73	137%
2017 March	83	69	14	75	111%
2017 April	144	131	13	75	192%
2018 May	175.6	174.6	1	93	189%

Trent Basin Precipitation Totals
April 30 to May 6, 2017

Coalition for Equitable Water Flow

Rainfall Totals April 30 to May 6, 2017			
Haliburton	April 30 to May 6	130 mm	5 inches
Peterborough	April 30 to May 6	117 mm	4.6 inches
Trenton	April 30 to May 6	164 mm	6.5 inches

Big Bob Lake Levels 2017
New Record High Early May

Coalition for Equitable Water Flow

Minden Wednesday May 10, 2017

(Source: The Highlander)

Since 2016 TSW have taken Substantial Action

Coalition for Equitable Water Flow

- Added 5 real-time snow gauges to augment manual readings
- Adopted enhanced weather forecasting based on AES satellite information
- Monitor inflow/outflow water balances to understand groundwater storage
- Adopted a precipitation/runoff model to provide inflows to lakes based on forecast precipitation and snowmelt
- Adopted a routing model to forecast flows and water levels throughout the system

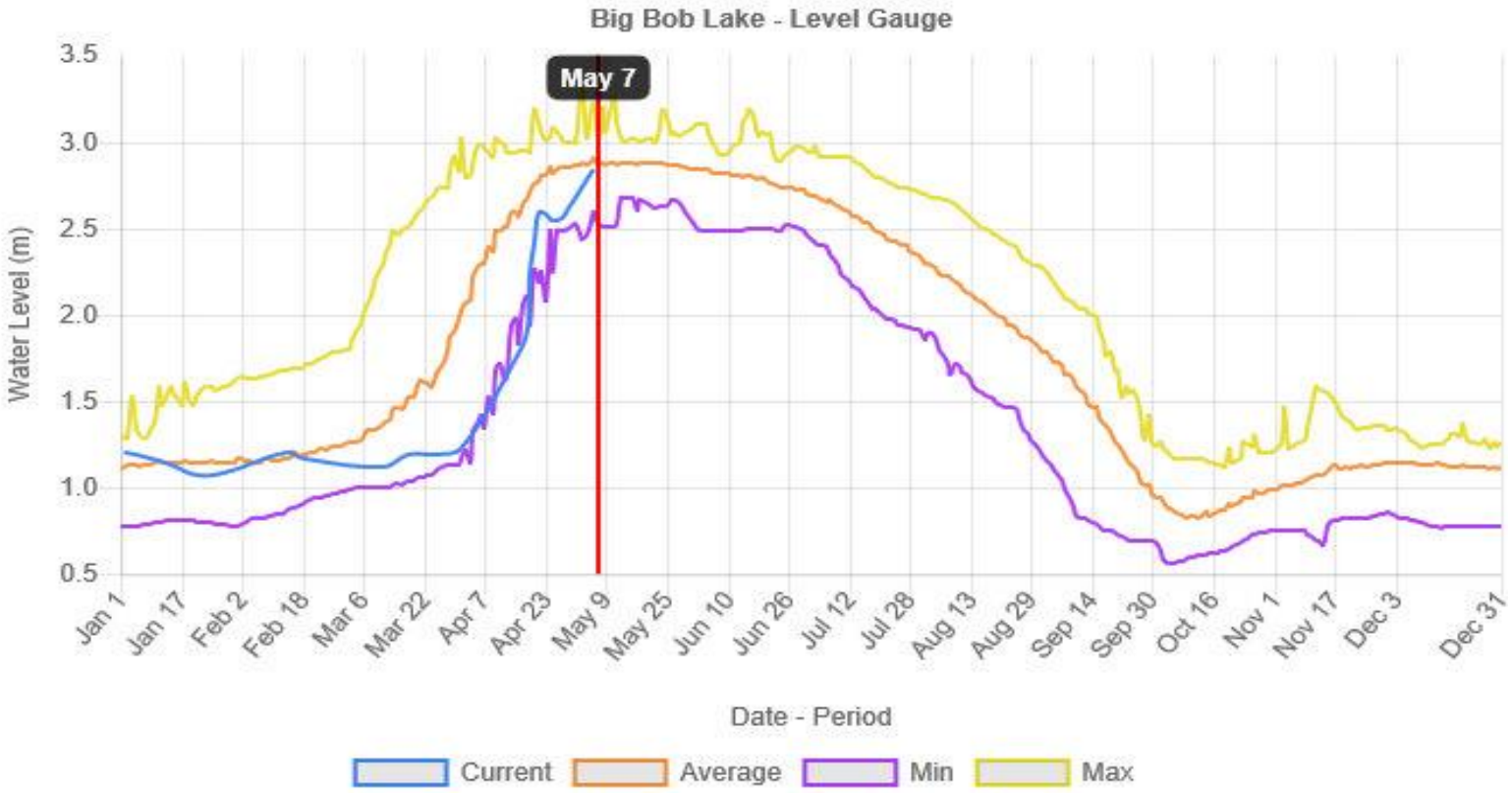
2019 Winter/Spring Precipitation Haliburton

Coalition for Equitable Water Flow

2019 Month	Ppte Total mm	Rain mm	Snow cms	Normal Monthly Total mms	Actual as % of Normal	Month End Snow on Grd cms	Notes
2019 January	106	10	96	100	106%	57	Norm snow on ground is 32 cms
2019 February	123	38	85	73	168%	68	Norm snow on ground end of month 42 cms
2019 March	80.8	34	46.2	75	108%	54	Norm snow on ground end of month 16 cms
2019 April	142	130.4	11.6	75	189%	0	72 mm precipitation from 17 to 20th and then 30mm on 25 and 26th.
2019 May				93		0	

Big Bob Lake Levels 2019

Coalition for Equitable Water Flow



Last Updated: May 7, 2019

Comparison of Four Recent High water Events

Coalition for Equitable Water Flow

Year	Event dates	Total Ppte mm	Notes
2013	April 15 to 19 5 days	61 mm	Rain on snow and some frozen ground. April Ppte 13mm vs 75 mm Normal (182% of Normal). Event concentrated in Haliburton.
2016	March 24 to 31 8 days	97 mm	March rainfall 171 mm vs normal 72 mm with 97 mm in last 8 days of month. Basin saturated. Late Ice out with Ice still on lakes.
2017	April 30 to May 6	128 mm	April Ppte 144 mm vs 75 mm normal (192% norma).
2019	April 2019	142 mm	End of March 54 cms snowpack vs 16 cms normal. April rainfall 142 mm vs 75 normal (189% of normal) onto snow and frozen ground.

What are the Climate Change Projections for the TSW?

Coalition for Equitable Water Flow

- There are multiple research efforts and reports underway and/or available.
- Four reports are particularly relevant to Climate Change impacts on the TSW:
  1. ***AECOM TSW Water Management Study 2011 (4 volumes)***
  2. ***Kawartha Conservation Two Recent Reports on Climate Change 2015 and 2016***
  3. ***Muskoka Watershed Council 2016***
  4. ***A 2016 report from FOCA/MNRF.***

Summary of Climate Change Implications for Water Management

Coalition for Equitable Water Flow

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.

Summary of Climate Change Implications for Water Management

Coalition for Equitable Water Flow

Summer and Fall

- More of our rainfall will be in more frequent major storm events. More frequent drought periods possible.
- With warmer summers, higher temperatures will cause more evaporation from the large Kawartha Lakes and large reservoirs, and the demand for reservoir water may be greater.
- In drought conditions minimum flow constraints may drawdown all lakes in the Gull and Burnt systems as experienced on the Burnt in July 2016.

CEWF's Initiatives Towards Adaptation to Changing Conditions in the TSW Reservoir Area

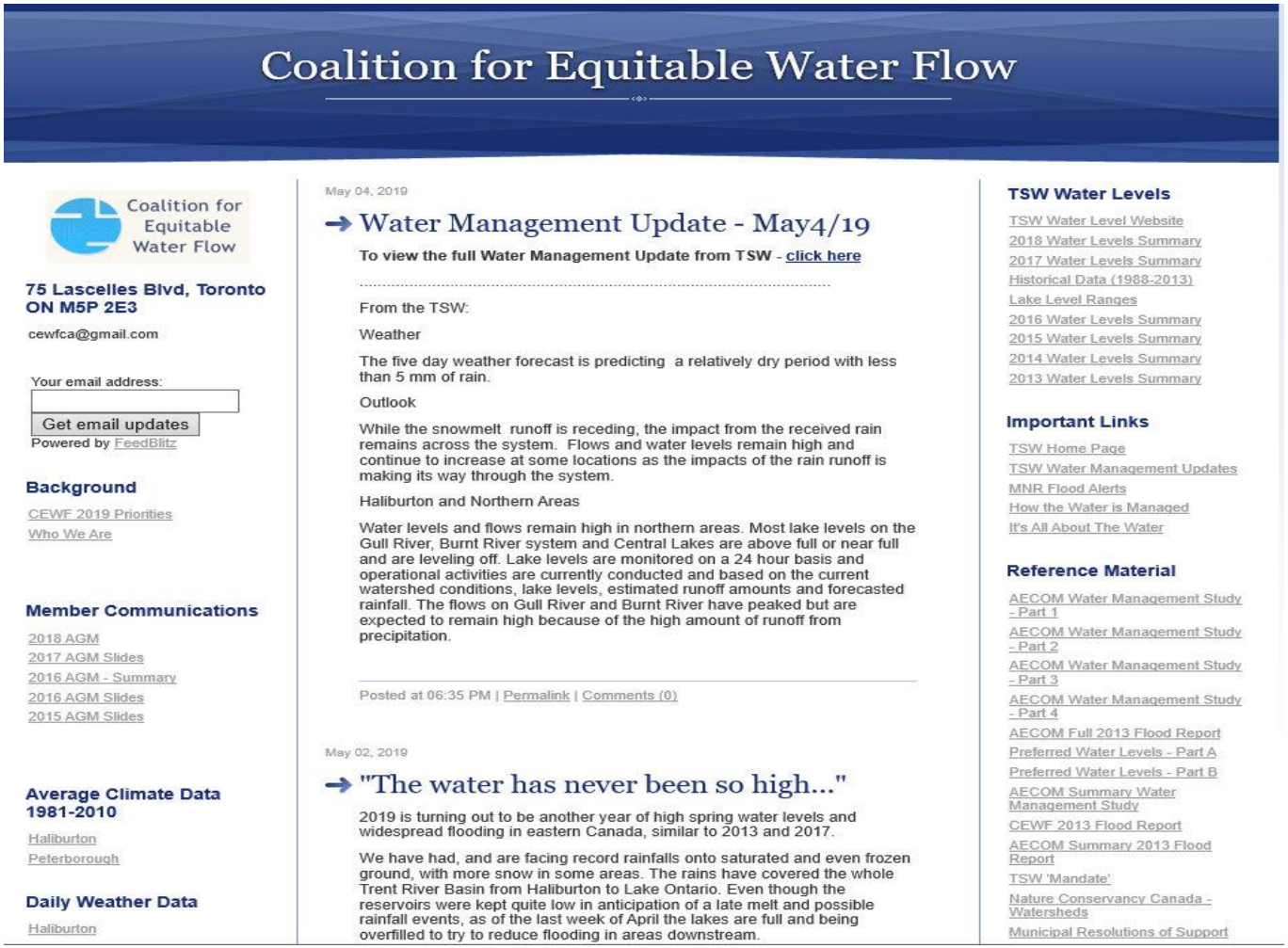
- Ensure the 2016 drought and 2013, 2016, 2017 and 2018 flood management experience is fully evaluated and captured in TSW protocols and documentation.
- **Help educate residents to changing winter/spring conditions** and increasing flood risk and likelihood of high water conditions with ice on lakes.
- Encourage **lake specific data collection** on potential impacts of flooding and extreme low water levels.
- Advocate for a TSW led **climate change study and strategy for the entire Trent Basin** identifying social and economic, as well as environmental impacts.
- Continue to advocate for **planning for integrated water management** across the entire Trent Basin.

What should you do?

- Be aware of the increased risk of extreme flood levels, potentially with ice on the lakes
  - Review your infrastructure and if appropriate make changes now – dock systems, electrical, boat storage
- Be aware of increased risk of low lake levels earlier in the season and at levels not previously experienced.
  - Review infrastructure for low levels – water lines, access, boat mooring, etc.

Cewf.ca

Links to TSW and CEWF News, TSW Water Levels, Water Management Updates and Level Forecasts



Coalition for
Equitable
Water Flow

Questions and Discussion