Ottawa River Regulation Planning Board

Commission de planification de la régularisation de la rivière des Outaouais

Flow Management in the Ottawa River Basin

May 6, 2025

Presentation Outline

Part A: The Ottawa River Basin and the Planning Board

- Facts about the Ottawa River basin
- Mandate of the Planning Board

Part B: Limits to Flood Mitigation

- Mostly a natural river during annual spring flood
- Flood volumes

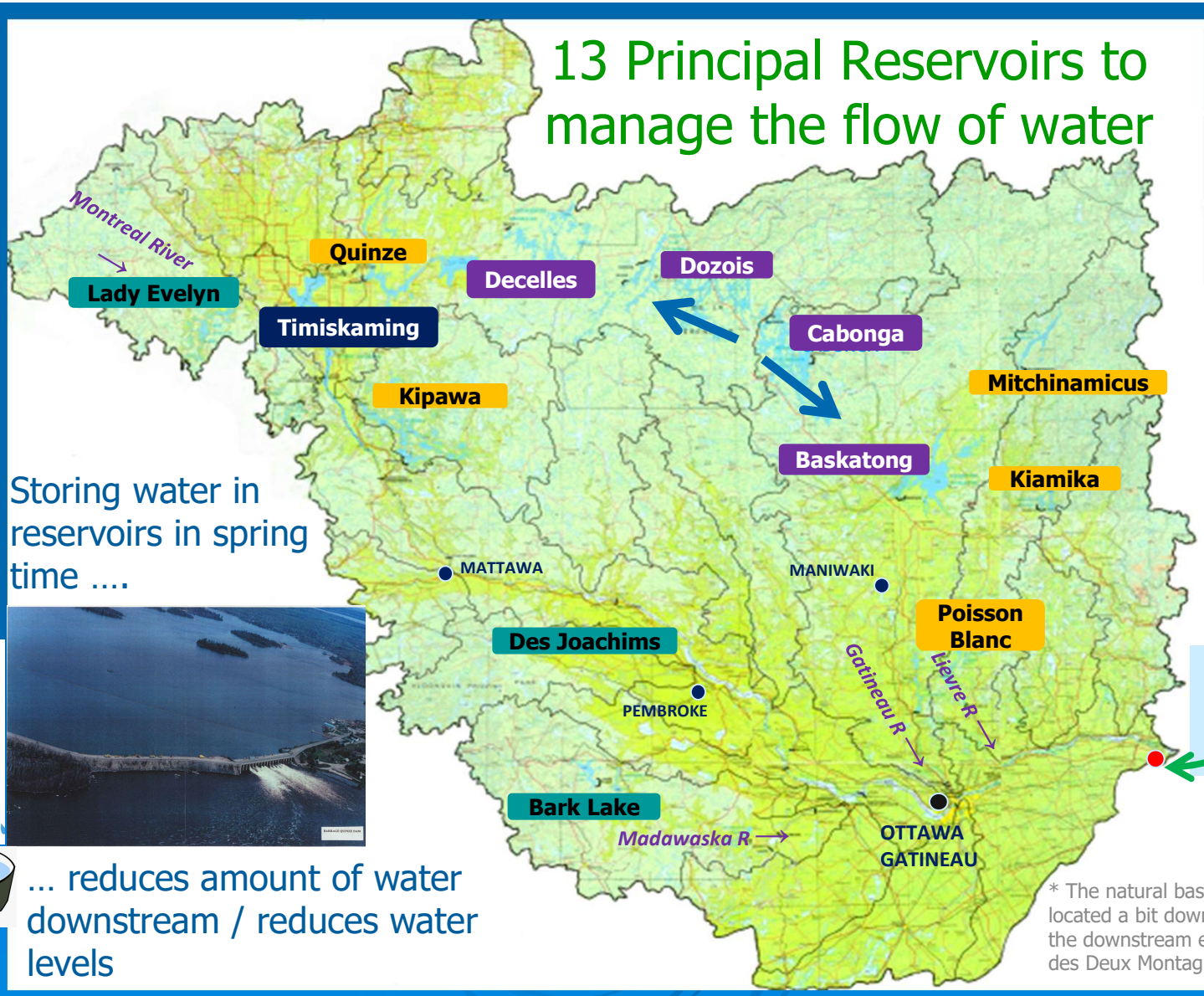
Part C: Communicating Hydrologic Information

- ORRPB website
- Communication pathways

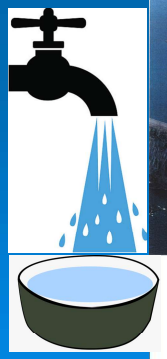
PART A

THE OTTAWA RIVER BASIN AND THE PLANNING BOARD

13 Principal Reservoirs to manage the flow of water



Storing water in reservoirs in spring time ….



… reduces amount of water downstream / reduces water levels

* The natural basin outlet is located a bit downstream at the downstream end of Lac des Deux Montagnes

Planning Board Main Objectives

The 1983 Canada-Ontario Quebec Agreement established:

- Ottawa River Regulation Planning Board (the Planning Board)
- Ottawa River Regulating Committee (the Committee)
- Ottawa River Regulation Secretariat (the Secretariat)

- *Main role* : to ensure that the flow from the principal reservoirs of the Ottawa River Basin are managed on a collaborative basis to reduce impacts of floods & droughts
- *Secondary role* : to ensure hydrological forecasts are made available to the public and government agencies for preparation of flood related messages

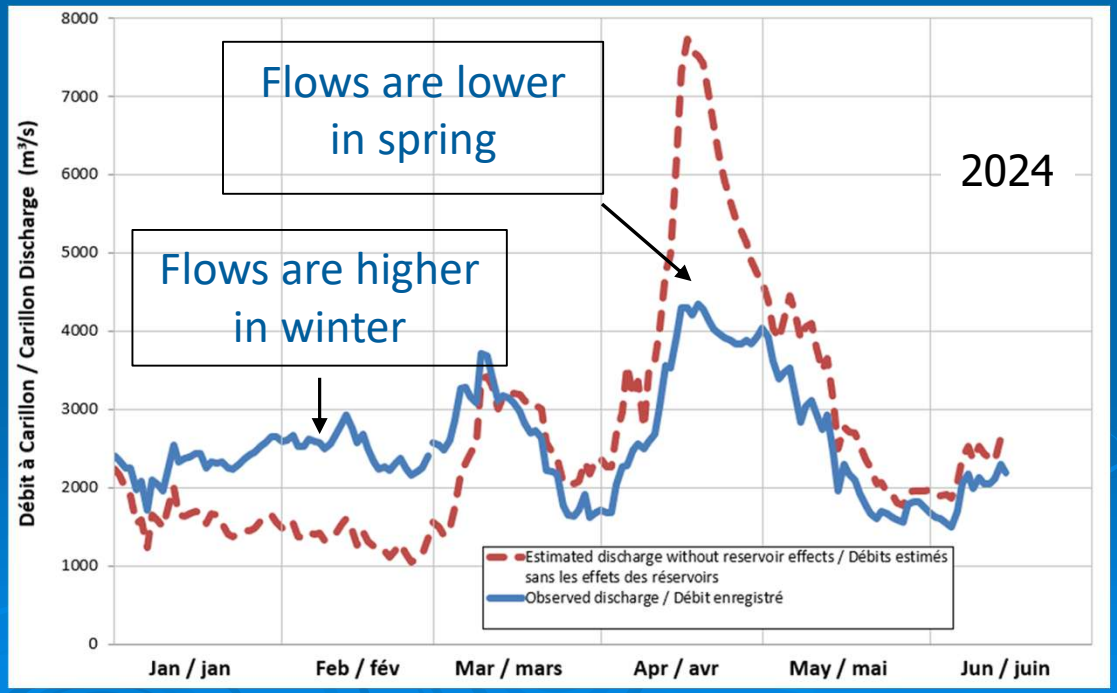
Something special about the Ottawa River

Principal reservoirs are used to partially regulate flows in the Ottawa River.

This partial regulation alters the natural flow pattern of the Ottawa River by:

- Reducing flows and flooding during the spring freshet (when reservoirs are filling with spring runoff)
- Augmenting flows in winter (when water is released from principal reservoirs)

CARILLON - OBSERVED FLOWS AND RESERVOIR EFFECTS



Collaborative Agreement

www.ottawariver.ca

The Planning Board

- Administrative and general policy function

The Committee

- Cooperative unit for day-to-day operation*, comprised of the four agencies that operate principal reservoirs

The Secretariat

- Primarily supports the Committee (also the administrative unit for the Planning Board)

* The Ontario Ministry of Natural Resources is an associate member as it contributes important hydrometeorological information and plays a key role in disseminating information in Ontario.

Planning Board Members

Quebec

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP)

Hydro-Québec

Canada

Public Services and Procurement Canada

Canadian Coast Guard

Environment and Climate Change Canada (ECCC)

Ontario

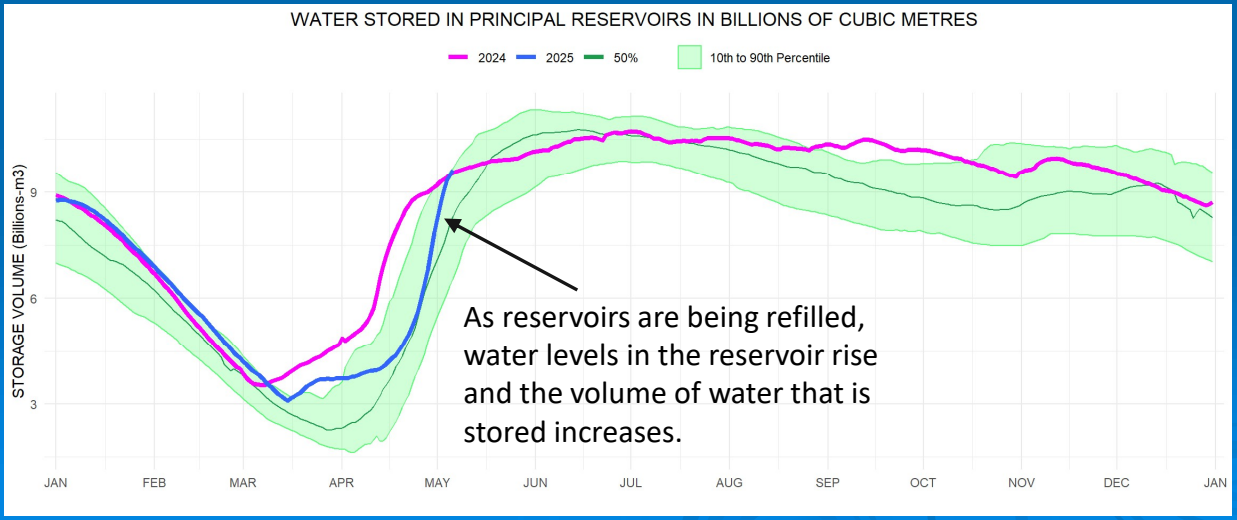
Ministry of Natural Resources (MNR)

Ontario Power Generation

- Planning Board reports to three parties that signed the 1983 Agreement
  - Ministers of MELCCFP, ECCC and MNR

Work of the Committee and Secretariat

- Continuous monitoring of conditions in the basin, the river and its tributaries
- Gradual drawdown of the principal reservoirs (December to end of March)
- Optimize reservoir refill timing to reduce flooding impacts (during spring) while ensuring reserve to mitigate possible droughts
- Uses weather forecasts to predict river conditions weekly throughout the year and daily during freshet

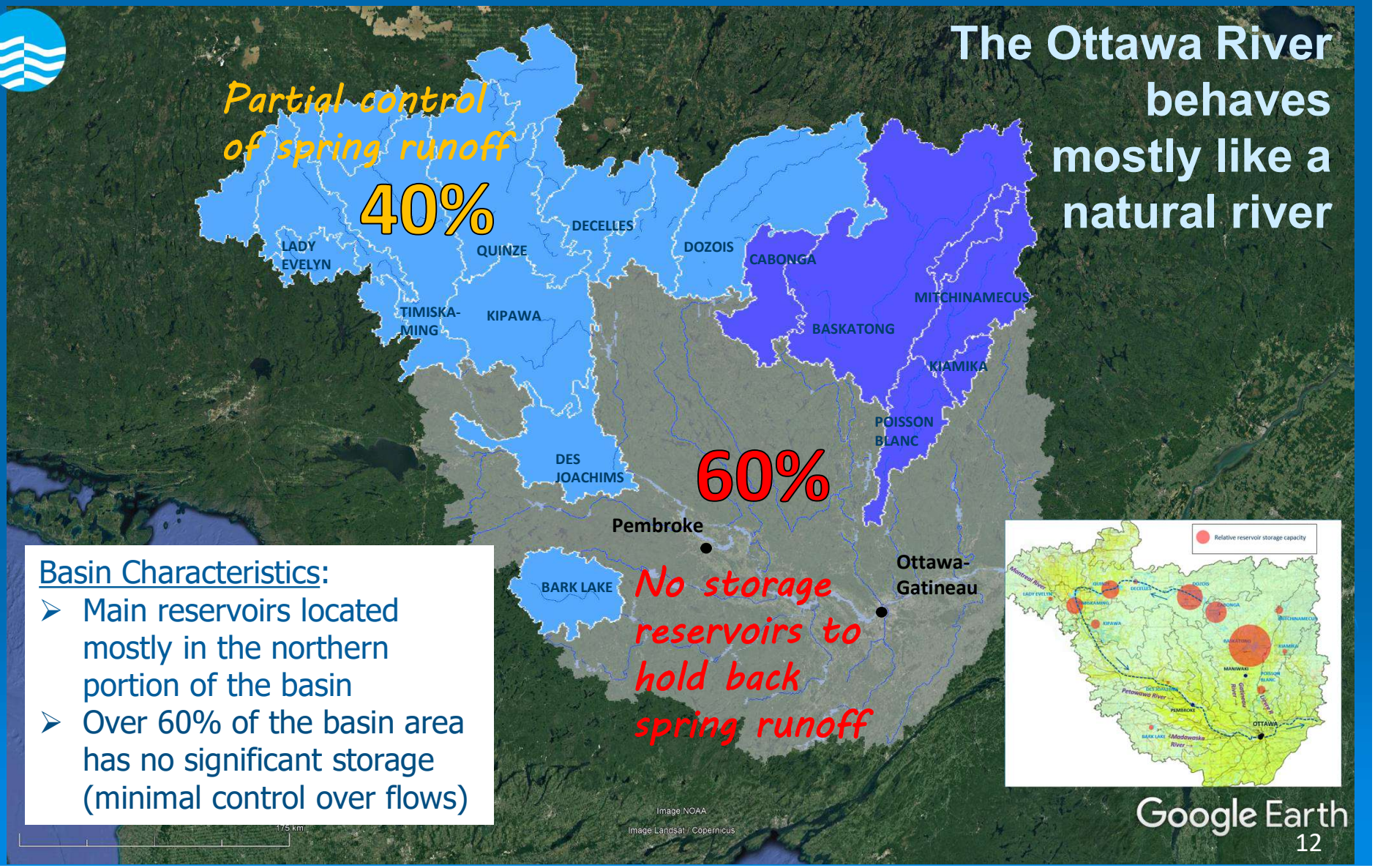


- Adjust release of water from reservoirs to optimize benefits and reduce risks
- Makes river conditions forecasts available to responsible authorities

PART B

LIMITS TO FLOOD MITIGATION

The Ottawa River behaves mostly like a natural river



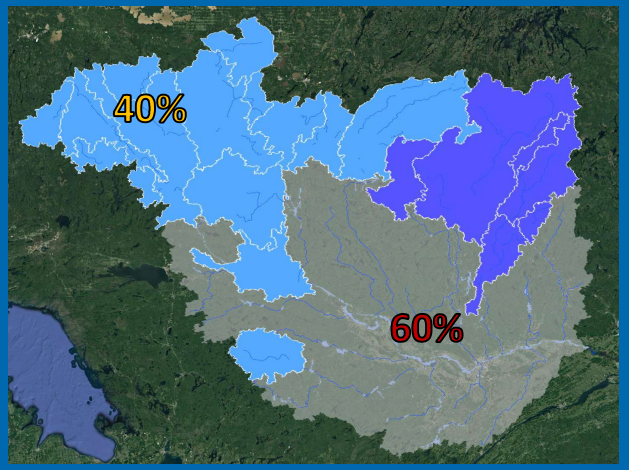
Basin Characteristics:

- Main reservoirs located mostly in the northern portion of the basin
- Over 60% of the basin area has no significant storage (minimal control over flows)

Limits of Reservoirs Effects

Flooding can occur when:

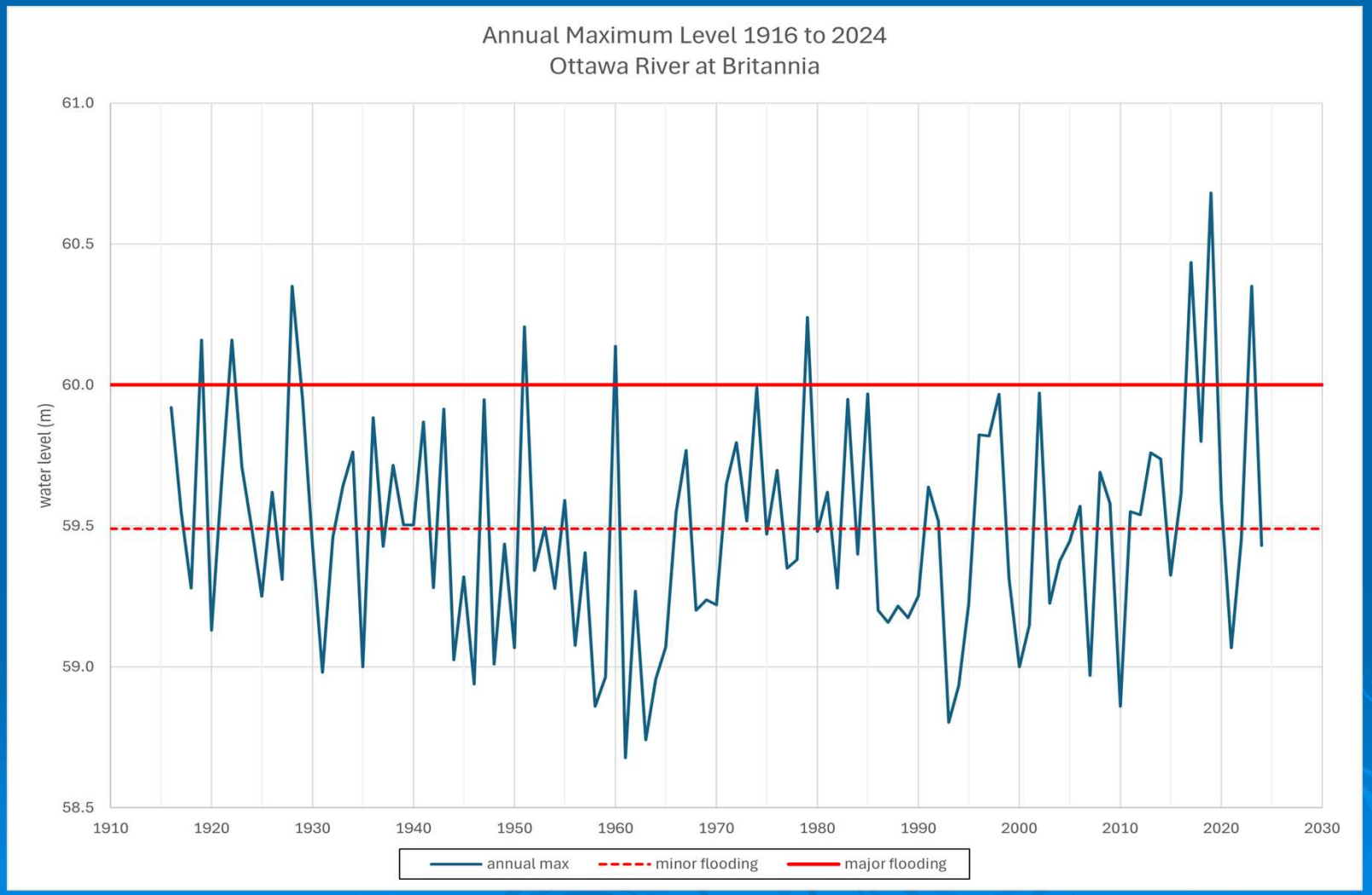
- There is significant spring runoff in areas where there are no reservoirs (in 60% of basin)
- Spring runoff greatly exceeds the size of reservoirs (in 40% of basin)

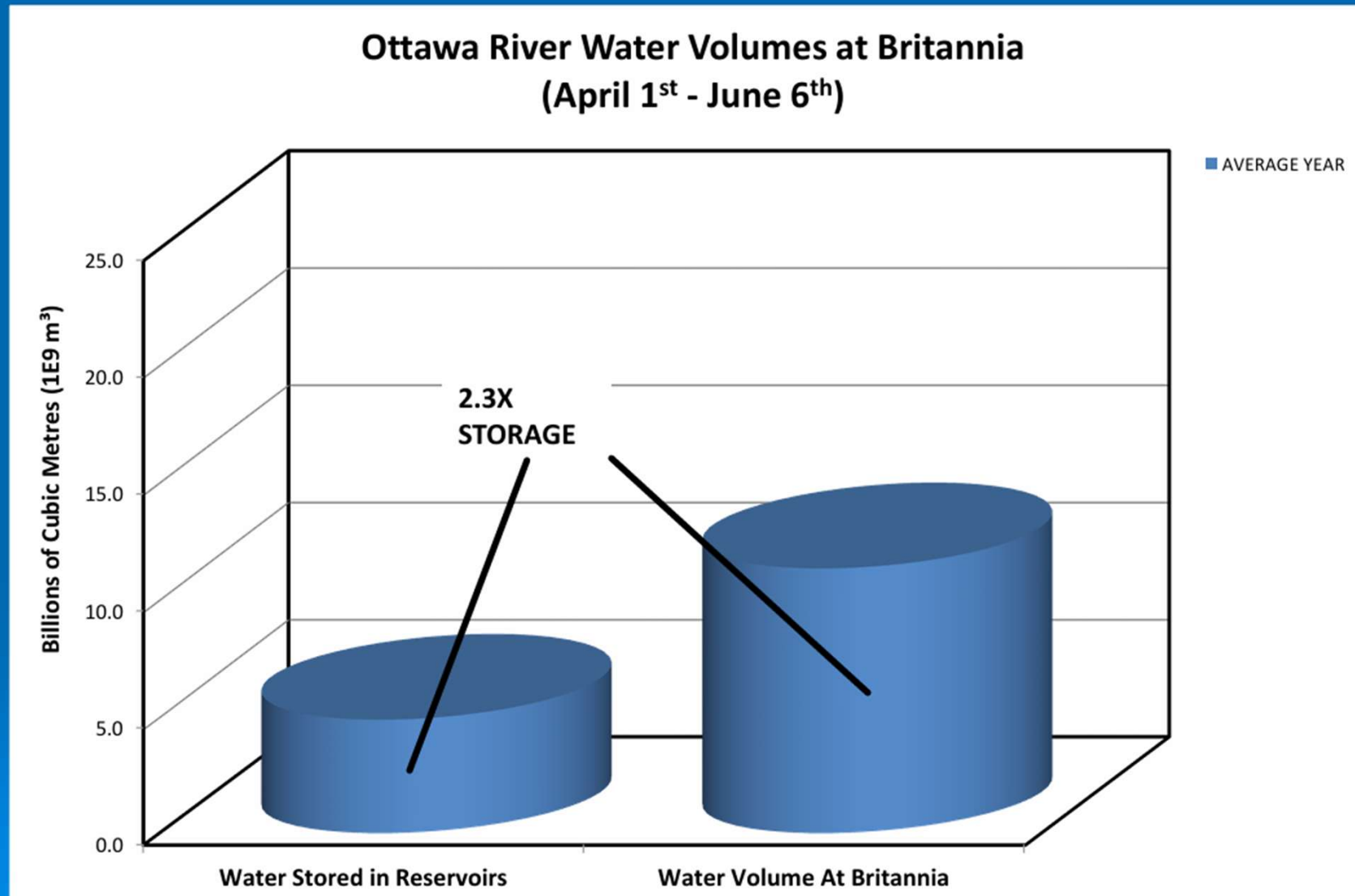


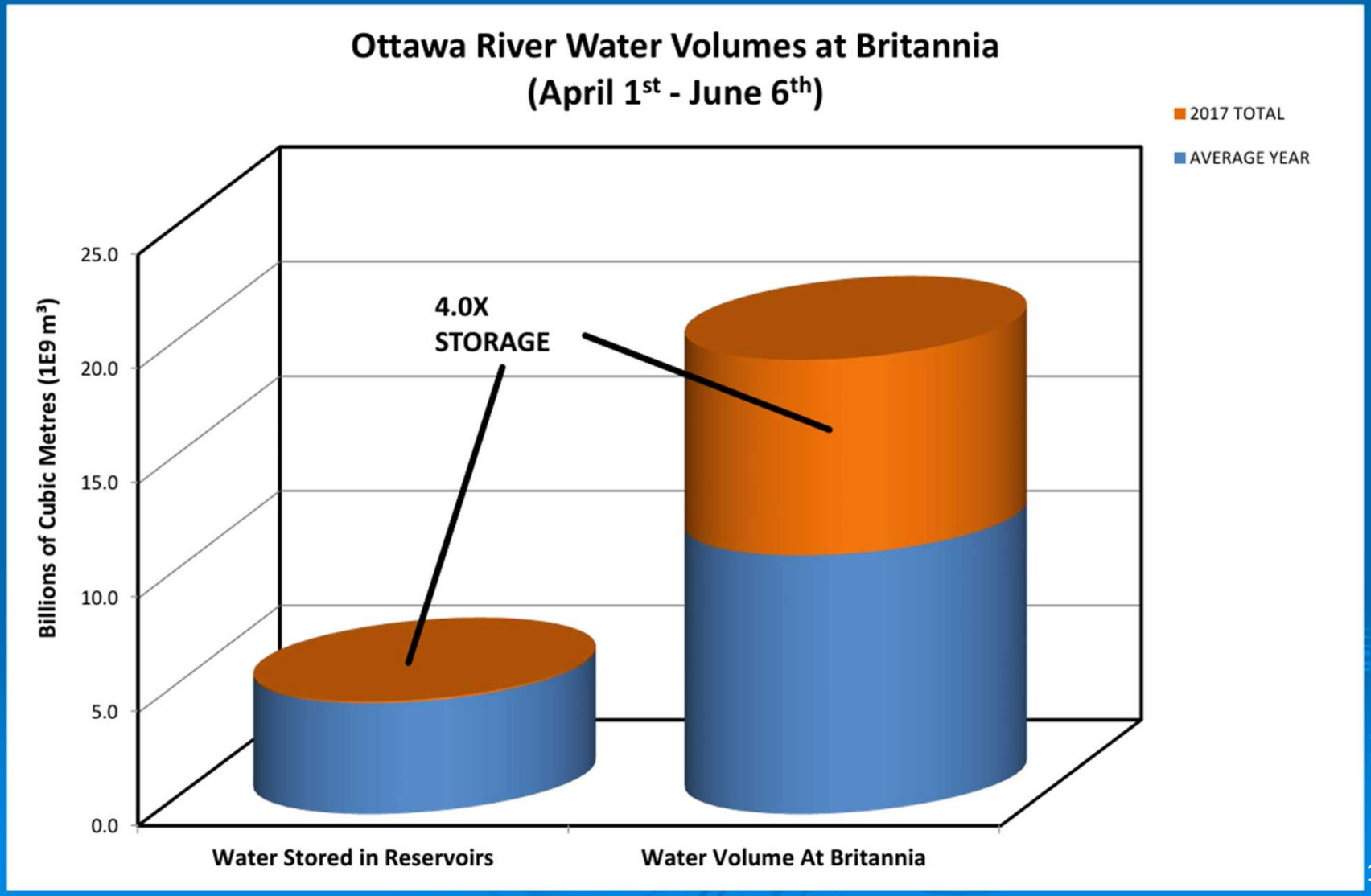
Reservoirs effects:

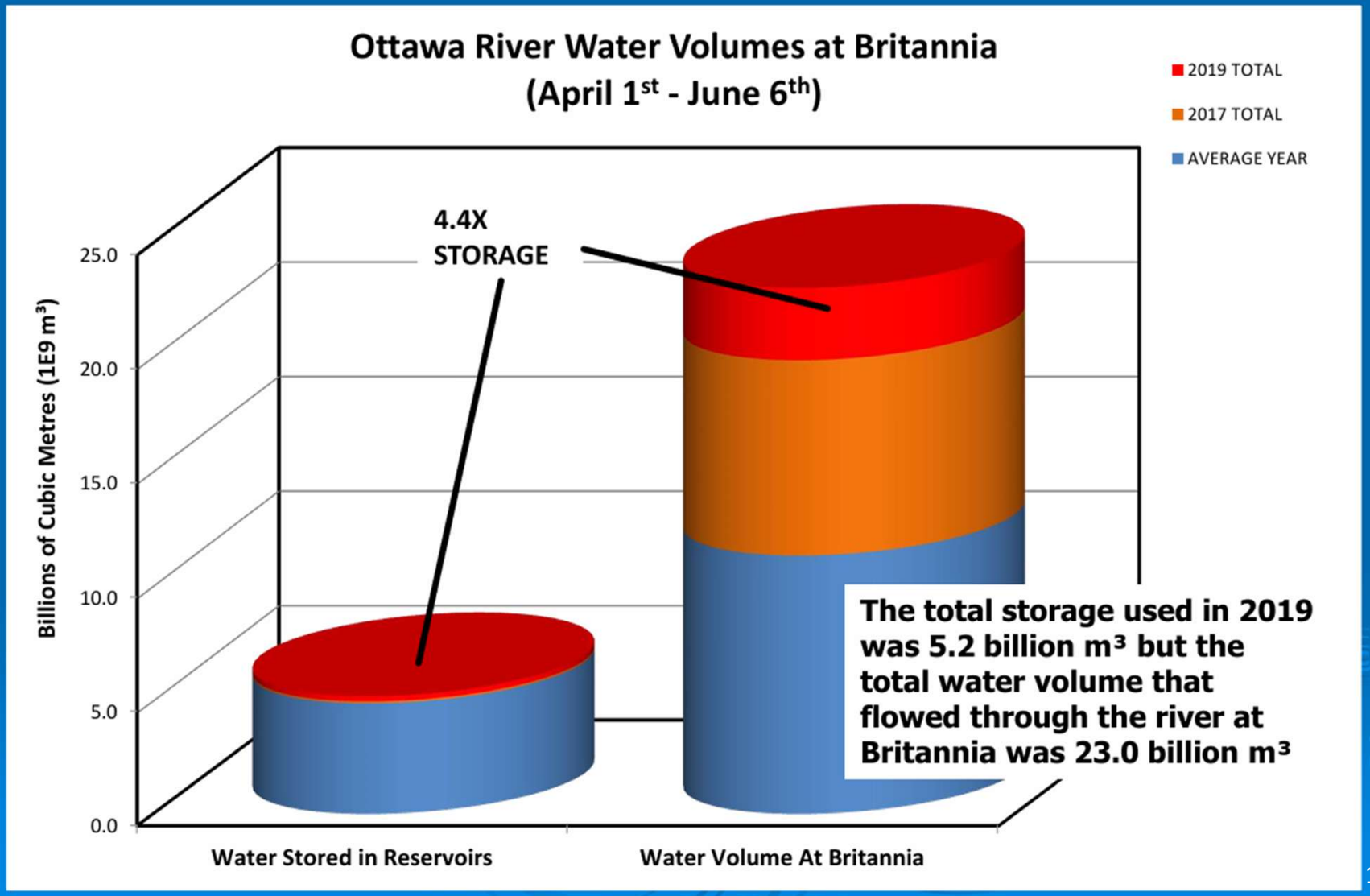
- Flooding extent and duration are always reduced
- Flooding is eliminated in many years

Estimated Reduction in Water Levels during the 2019 Flood Event As a result of Storing Runoff in Principal Reservoirs	
Lac Coulonge (Fort-Coulonge)	120 cm
Chats Lake (Arnprior)	60 cm
Lake Deschenes (Britannia)	75 cm
Gatineau (Hull)	130 cm
Lac des Deux Montagnes	95 cm


Annual Maximum Level 1916 to 2024
Ottawa River at Britannia
water level (m)
61.0
60.5
60.0
59.5
59.0
58.5
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
annual max
minor flooding
major flooding


Ottawa River Water Volumes at Britannia
(April 1st - June 6th)
AVERAGE YEAR
Billions of Cubic Metres (1E9 m³)
25.0
20.0
15.0
10.0
5.0
0.0
2.3X
STORAGE
Water Stored in Reservoirs
Water Volume At Britannia

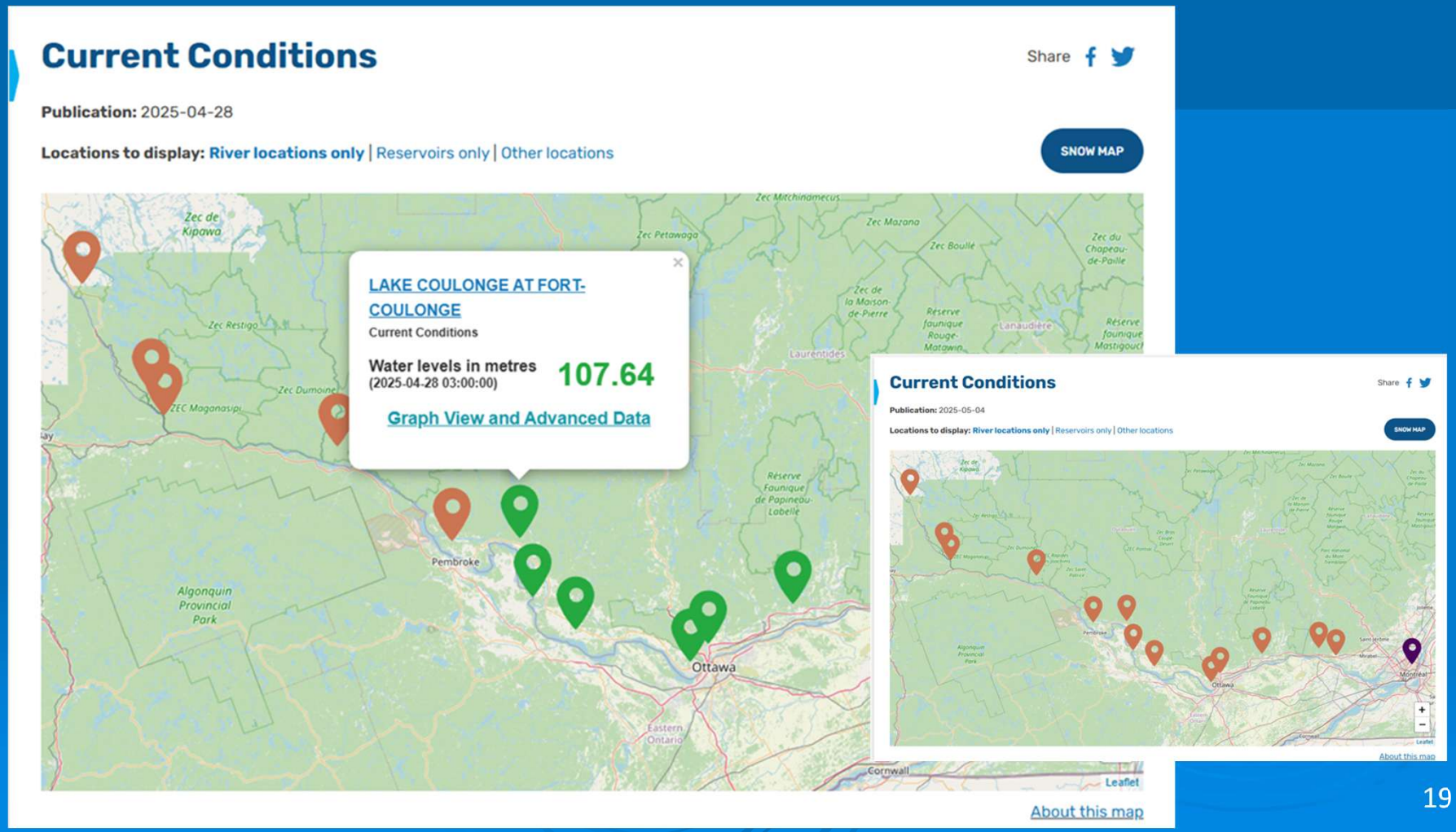

Ottawa River Water Volumes at Britannia
(April 1st - June 6th)
2017 TOTAL
AVERAGE YEAR
Billions of Cubic Metres (1E9 m³)
25.0
20.0
15.0
10.0
5.0
0.0
4.0X
STORAGE
Water Stored in Reservoirs
Water Volume At Britannia


Ottawa River Water Volumes at Britannia
(April 1st - June 6th)
2019 TOTAL
2017 TOTAL
AVERAGE YEAR
4.4X
STORAGE
Billions of Cubic Metres (1E9 m³)
25.0
20.0
15.0
10.0
5.0
0.0
Water Stored in Reservoirs
Water Volume At Britannia
The total storage used in 2019 was 5.2 billion m³ but the total water volume that flowed through the river at Britannia was 23.0 billion m³

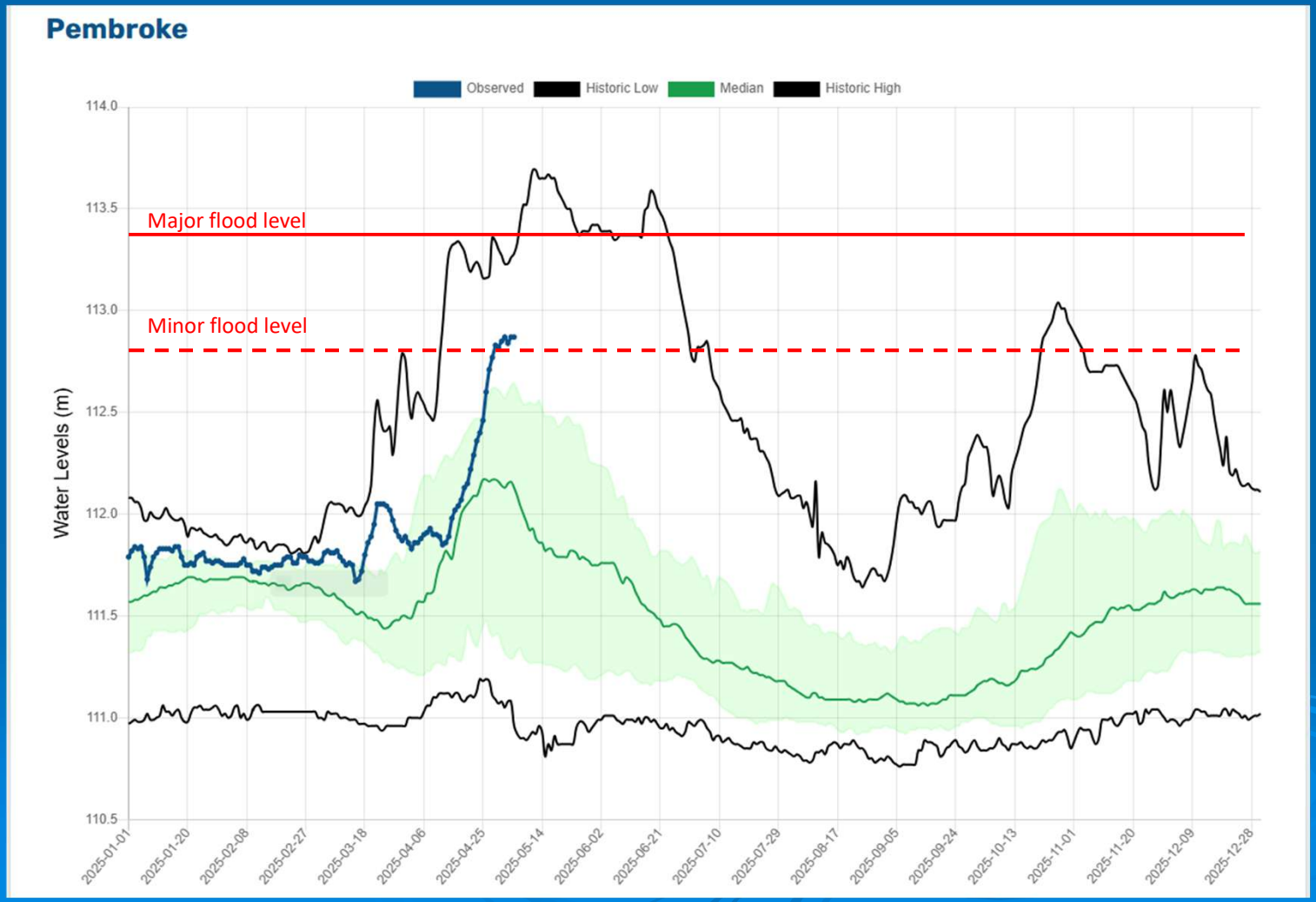
PART C

COMMUNICATING HYDROLOGIC INFORMATION

ORRPB Website www.ottawariver.ca



2025 – Water Levels at Pembroke Gauge



Municipalities
Respond to Flood Events

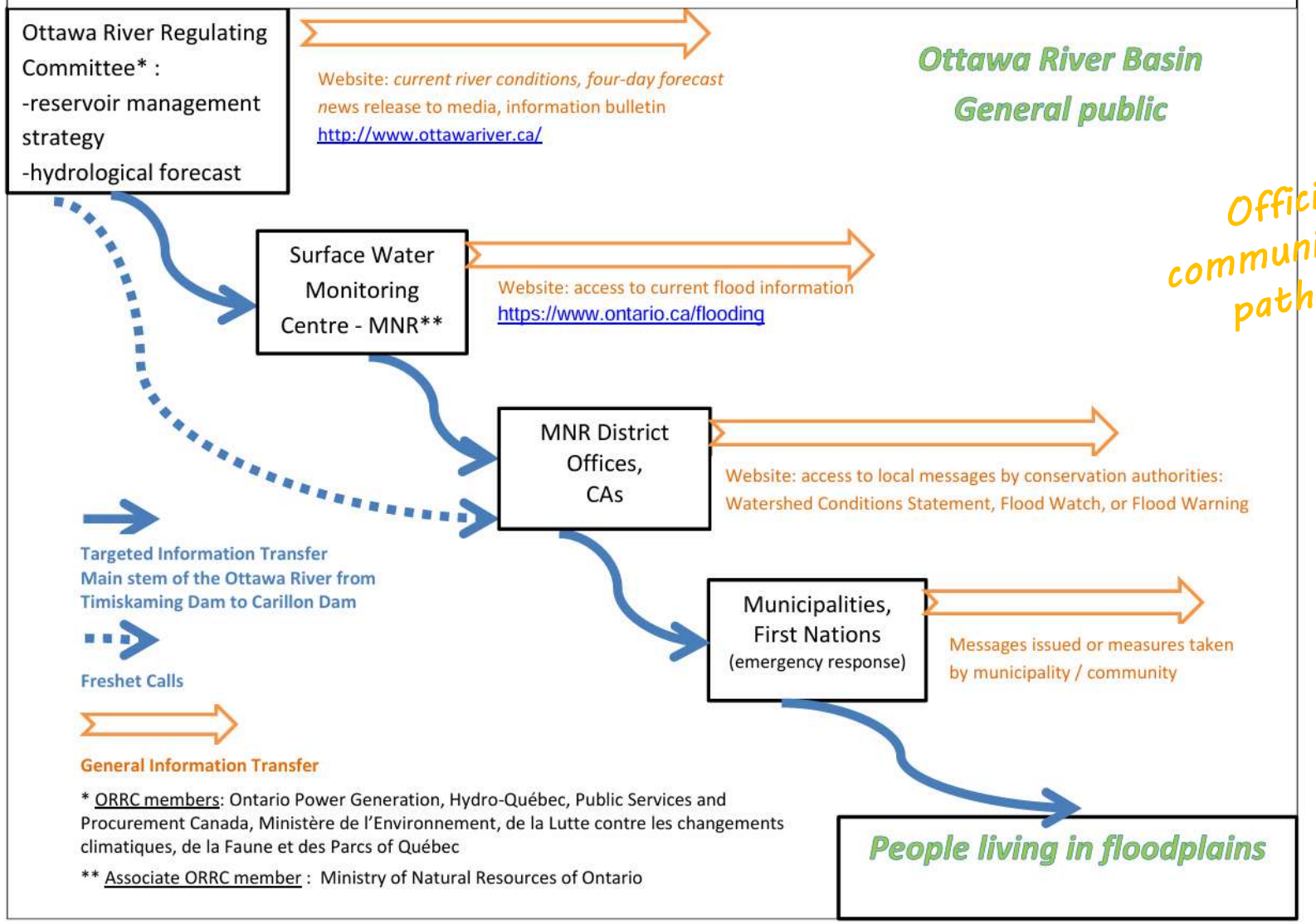
Roles and responsibilities of municipalities in emergency response include:

- Determining appropriate response to a flood threat and if necessary, deploy municipal services.
- If required, implementing their Emergency Response Plan.
- Maintaining liaison with flood coordinators at the provincial level:
    - In Ontario - liaison with conservation authorities or MNR District Offices
    - In Quebec - liaison with *Sécurité civile* and *Centre des opérations gouvernementales*

For complete information on roles and responsibilities:

- In Ontario: refer to the Emergency Management and Civil Protection Act (**Emergency management | ontario.ca**)
- In Quebec: refer to the **Plan national de sécurité civile | Gouvernement du Québec (quebec.ca)**

COMMUNICATION OF OTTAWA RIVER HYDROLOGIC FORECAST – ONTARIO FLOW CHART



* ORRC members: Ontario Power Generation, Hydro-Québec, Public Services and Procurement Canada, Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs of Québec

** Associate ORRC member : Ministry of Natural Resources of Ontario

Ontario

Bulletin

Ministry of Natural Resources

Flood Warning

Pembroke District

Ottawa River

Friday, May 02, 2025
4:00 pm

The Ministry of Natural Resources – Pembroke District is advising area residents that a Flood Warning is in effect for areas along the **Ottawa River** until Friday, May 09, 2025 (if not updated/replaced).

Recent rainfall combined with warmer temperatures has melted most of the remaining snow locally. Remnants of the snowpack through the northern portion of the Ottawa river watershed are expected to continue to melt sustaining elevated levels and flows. This combined effect is causing the water levels and flows of the Ottawa River to rise.

Residents along the main stem of the Ottawa River and upstream of the confluence of any tributaries should Consider the following:

Accounting for the combined effect of the rapid snowmelt and the forecasted rain event, minor flooding thresholds have been exceeded along the main stem of the Ottawa River from Timiskaming to Britannia. Major flooding thresholds are not anticipated to be exceeded at this time however a close watch on the weather forecast is recommended as conditions can change rapidly.

Closing Remarks

- The Ottawa River is only partially regulated. In spring, the river is largely at the mercy of natural snowmelt and rainfall events. Flooding has occurred in the past and will occur again. Droughts can also occur.
- The Committee monitors river conditions all year long and optimizes the use of principal reservoirs to reduce impacts of extreme events in the Ottawa River, its major tributaries and the Montreal region.
- If your home is located in the river floodplain, know how to stay informed and be ready for all river conditions.
- The governments of Canada, Ontario, and Quebec collaborate with Ontario Power Generation and Hydro-Québec to support the work of the Ottawa River Regulation Planning Board including the Committee and Secretariat.

Information

Current and forecast conditions during freshet	**www.ottawariver.ca** **www.rivieredesoutaouais.ca**	*Conditions actuelles et prévues en rivière pendant la crue*

@ORRPB

Post

@CPPRO

Recorded message	*Message téléphonique*
819-303-5886 Ottawa-Gatineau 1-800-621-0059 Outside	*819-303-5886 Ottawa-Gatineau* *1-800-621-0059 À l'extérieur*

Ottawa River
Regulation Secretariat
Email : secretariat@ottawariver.ca

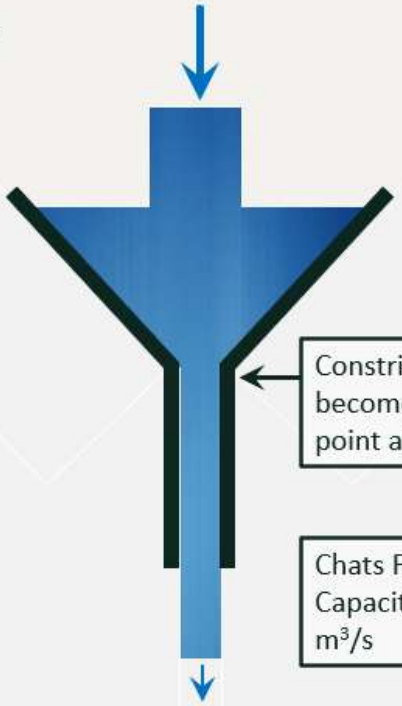
Secrétariat pour la régularisation
de la rivière des Outaouais
Email : bureau@ottawariver.ca

- Questions?

Natural River Constrictions

River constrictions are similar to funnels.

- Water will not build up in the funnel if poured in more slowly than the capacity of the narrow section.
- If water is poured in more quickly it will back up.
- Conditions downstream cannot lessen the backup caused by the constriction; the constriction is the control point.



Chats Lake

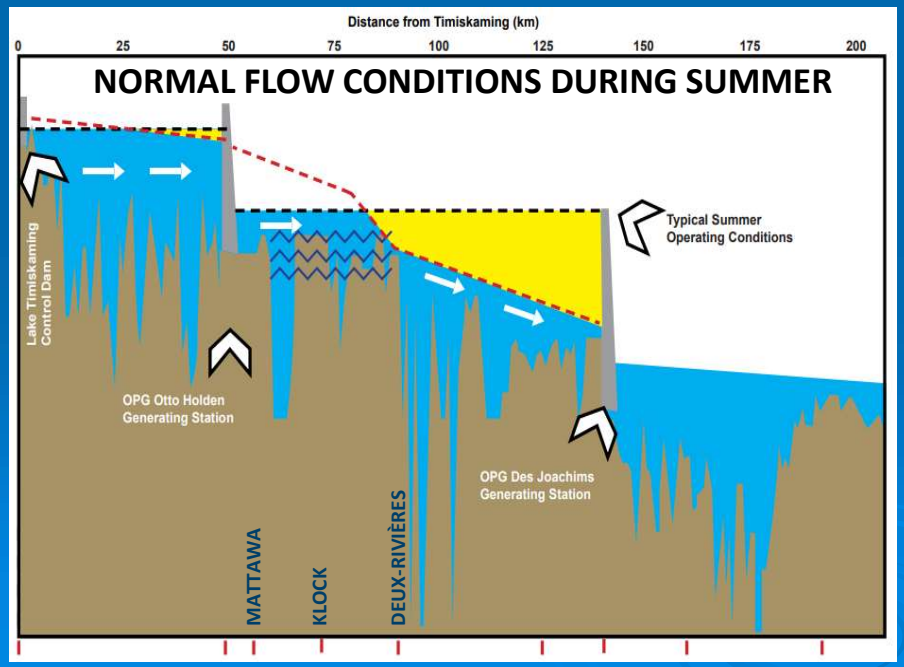
Constriction becomes control point at 2180 m^3/s

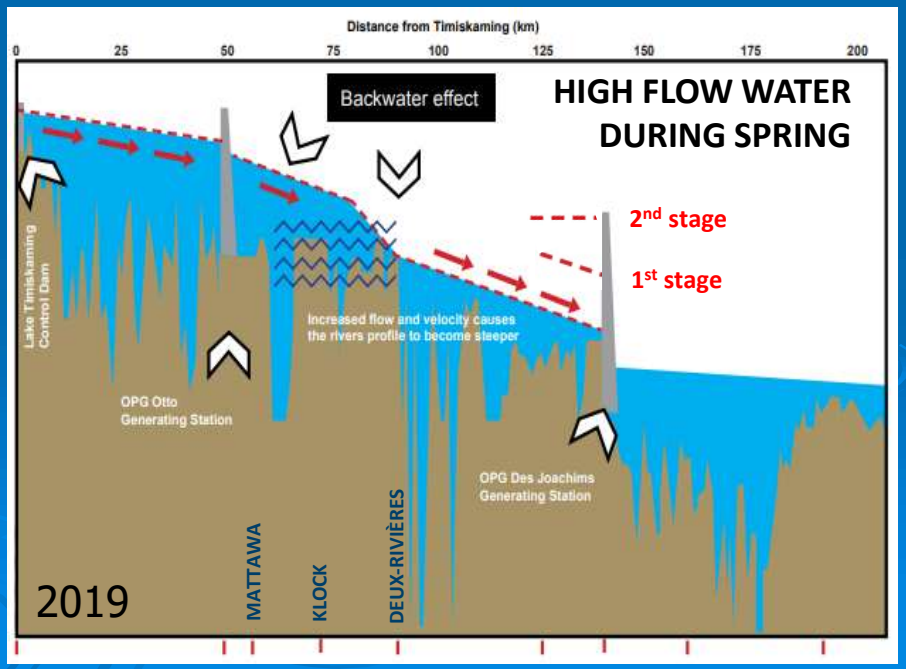
Chats Falls dam Capacity = 12,472 m^3/s

Des Joachims – Run-of-river AND Reservoir

- Des Joachims reservoirs is the last of the 7 principal reservoirs located upstream of Pembroke to be completely refilled.
- It is operated as a run-of-river facility when there is a risk that high Ottawa River flows cause flooding in Mattawa.
- The spring refill strategy consists of two stages.
- The purpose is to reduce the risk of upstream flooding and provide some relief, when possible, to flooding downstream areas.

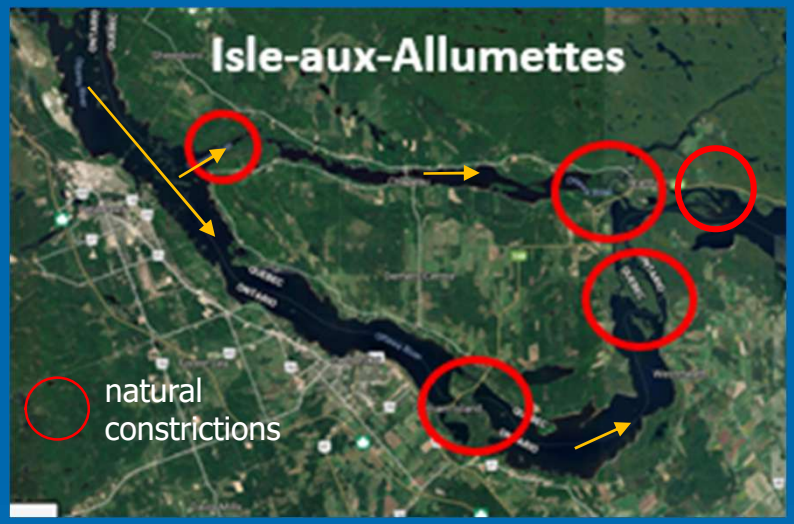
*View a video on managing high water levels on the Ottawa River **here**.*





Do downstream dams influence water levels in Pembroke?

- The presence of multiple natural constrictions in the river raises levels at Pembroke during periods of high flow.
- Downstream dams have no influence on the river levels at Pembroke.
- When flows are high, the Bryson and Rocher Fendu dams pass all arriving flow from Lake Coulonge.



No downstream dam operator can "lower the water level" at Pembroke.

The only means of reducing levels at Pembroke is to reduce upstream flows. This is helped by filling the principal reservoirs during freshet.

Between Pembroke and the Bryson dam, there are multiple natural constrictions (narrows, rapids, presence of islands).

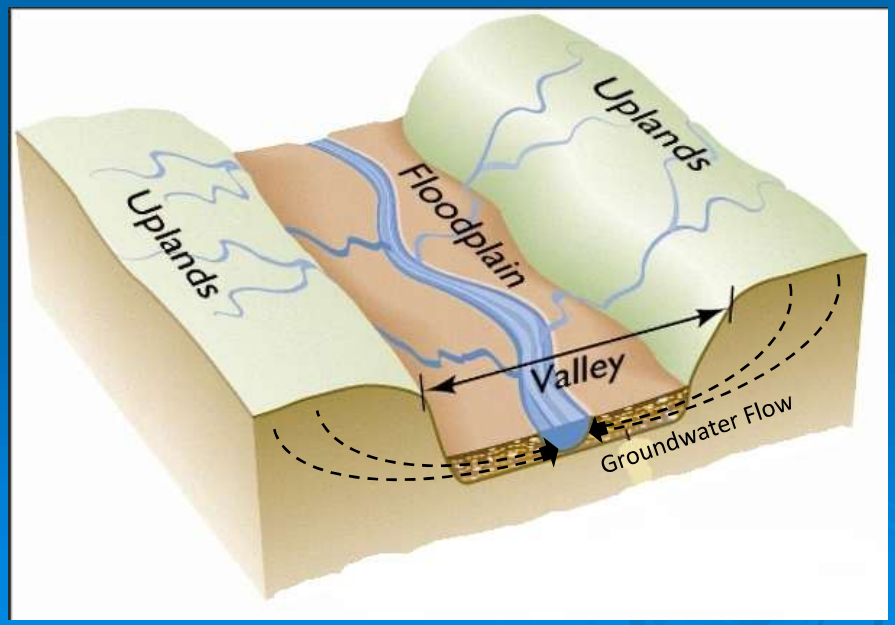
Is flooding the new norm?

Flooding occurs naturally when the water in the river needs more space and overflows onto normally dry land, which is called the floodplain.

Flooding is NOT expected to happen every second year.

Flooding is driven by weather, and weather can be cyclical.

Then flooding can be cyclical too. Flood events can be clustered.



Probabilities are used to describe how likely a flood is to occur.

There are 5 chances in 100, or a 5% chance, of having a medium flood (e.g. a 20-year flood) during a given year.

There is a 1% chance of having a very large flood (e.g. a 100-year flood) during a given year.

Will climate change make flooding worse?

What research studies say:

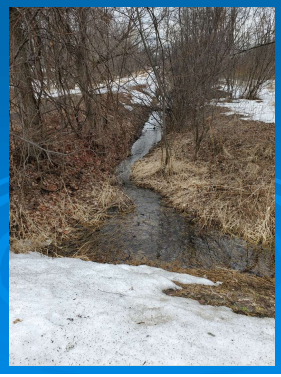
- Extreme rainfall events are more likely to occur.
- This makes flooding worse in smaller watersheds or areas, like in cities.
- The Ottawa River watershed is very large and flooding is more complex. Flooding along the Ottawa River typically occurs in spring, when the snow cover melts and rain is not absorbed by soils.
- Seasonal flows are expected to vary more, changing from wet to dry more rapidly and more often.

Climate change can affect flooding factors differently:

- More spring rain increases flood risk
- Variable snow cover means risk varies
- Faster snowmelt increases flood risk
- More evapotranspiration lowers flood risk

Lots of uncertainty

Refer to FAQ # 14



Can reservoirs be increased?

Not feasible to prevent flooding in all locations:

The size of land needed to build new or expanded reservoirs would be too large.

Studies conducted in the 1980s showed costs of new reservoirs outweigh potential benefits.

Study results still considered relevant today.

No global solution

Modern feasibility studies include:

- Environmental impacts, including those to aquatic environment
- Social and cultural impacts of displacing people and changing the landscape
- Lifespan of the structure and on ongoing maintenance costs
- Risk of encouraging further development in the floodplain
- Social acceptability