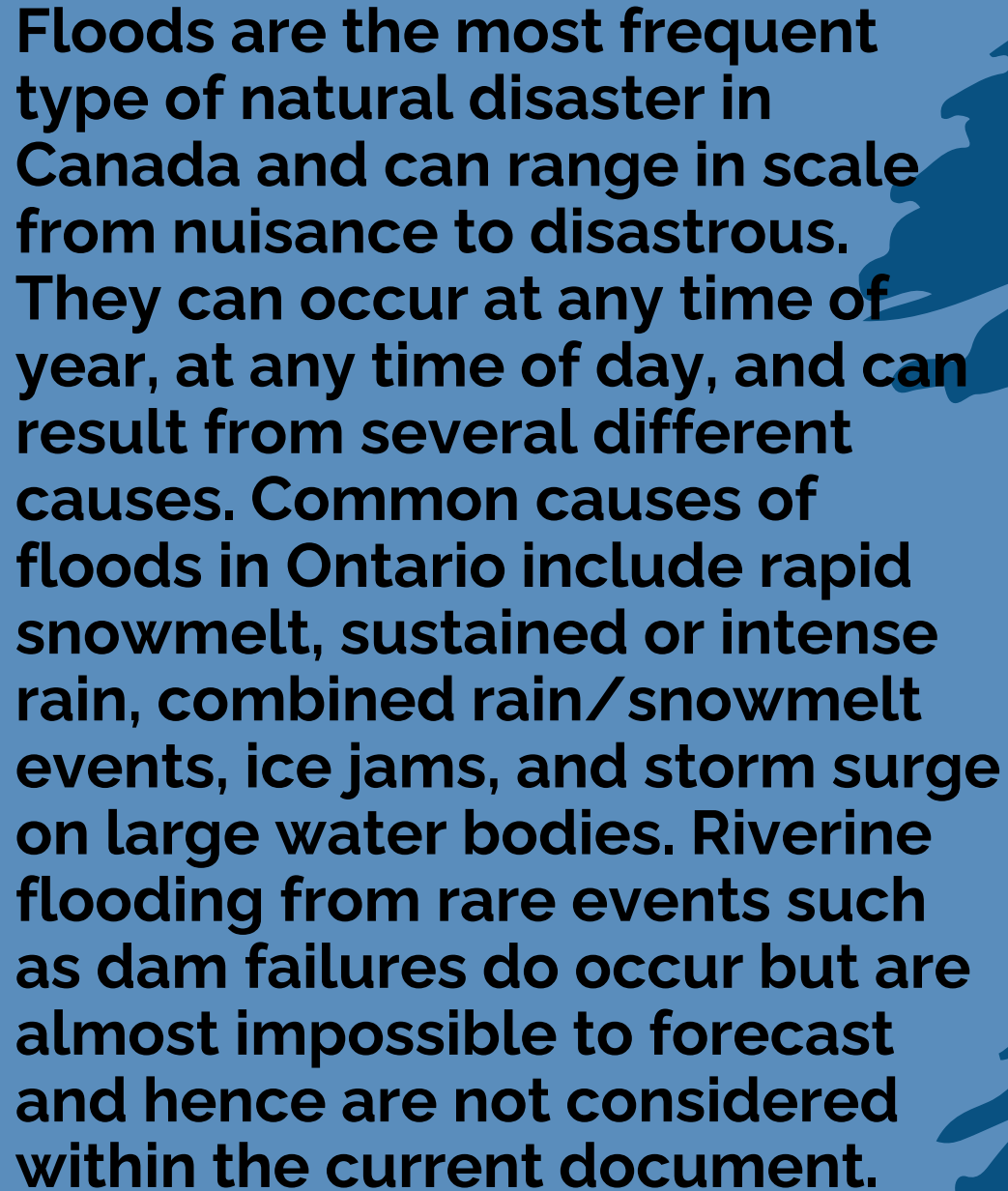





**CITY OF OTTAWA
SPRING FRESHET
TASK FORCE
OPERATIONS**

**Flood Preparedness
and Response for the
Ottawa and Rideau
River Systems**






Floods are the most frequent type of natural disaster in Canada and can range in scale from nuisance to disastrous. They can occur at any time of year, at any time of day, and can result from several different causes. Common causes of floods in Ontario include rapid snowmelt, sustained or intense rain, combined rain/snowmelt events, ice jams, and storm surge on large water bodies. Riverine flooding from rare events such as dam failures do occur but are almost impossible to forecast and hence are not considered within the current document.



Provincial Flood Forecasting and Warning Program

Implementation Guidelines for
Conservation Authorities and the
Ministry of Natural Resources and Forestry



Flood Forecasting & Warning Partners



***Source: Provincial Flood Forecasting and Warning Program - Implementation Guidelines for Conservation Authorities and the Ministry of Natural Resources and Forestry**

Flood Forecasting & Warning Components





Flood Risks in the Ottawa Region

- Riverine – Local freshet: Rideau River, and smaller waterways
- Riverine - Ottawa River freshet
- Pluvial - Events within spring freshet season
- Pluvial - Events throughout the remainder of the year
- Potential flooding related to failure of dams or infrastructure

Ottawa River Watershed

146,300 km²; 1271 km in length; 8th largest river in Canada

Largest tributary of the St. Lawrence River

65% Quebec, 35% Ontario

40% partially controlled, 60% uncontrolled

Partnerships for forecasting and water management

At 1% return in 2019, approx. 460 residences & 50+ roads were affected

Approx. 90km river exposure across Ottawa

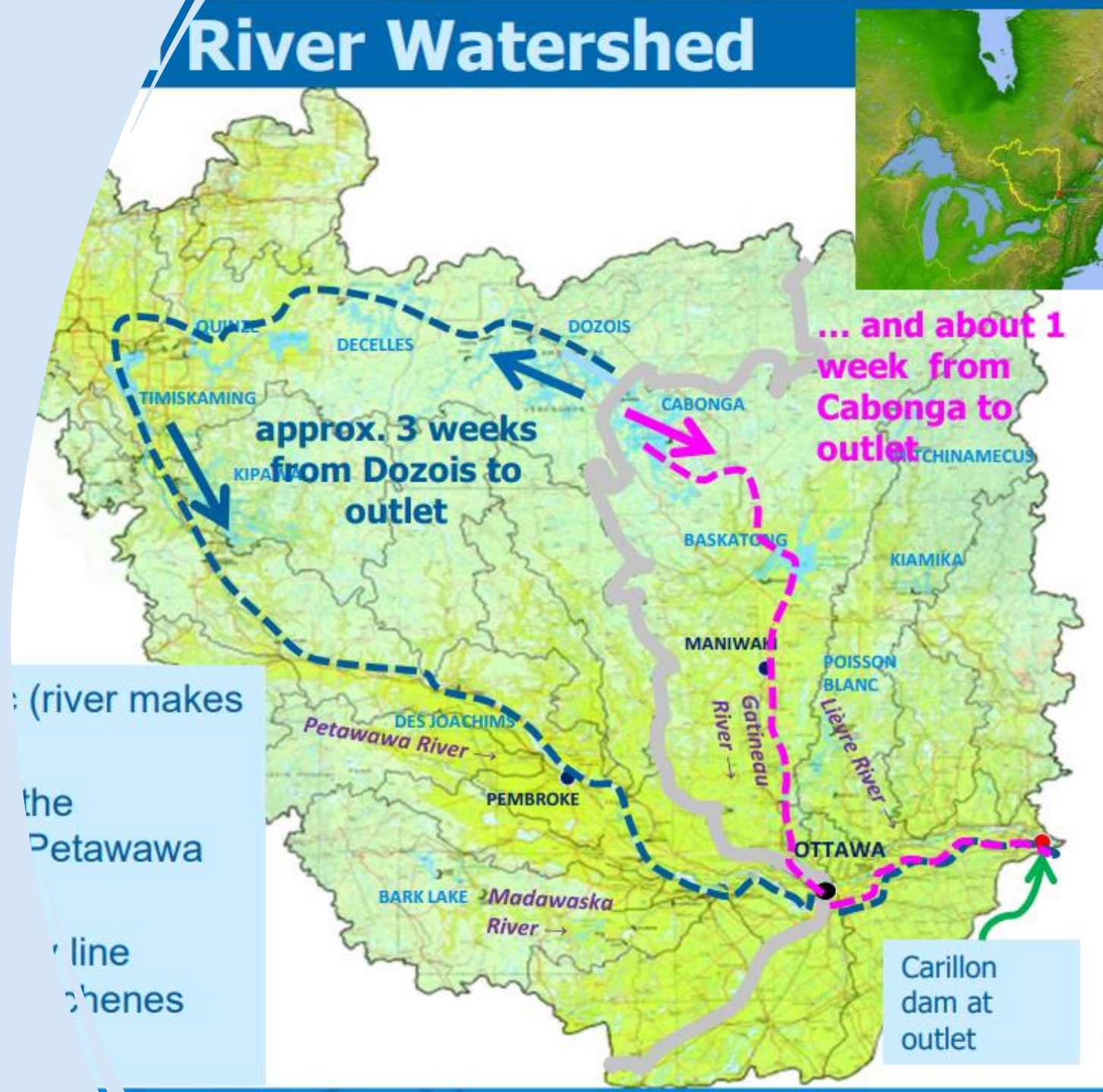
Rideau River – Largest Local River

Approx 60+km within Ottawa

At 1% return >1000 potential properties affected

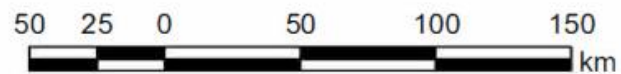
Additional flood prevention – Rideau River Flood Control

Recent historical flooding $\leq 1:20$ (5%) = Nuisance flooding

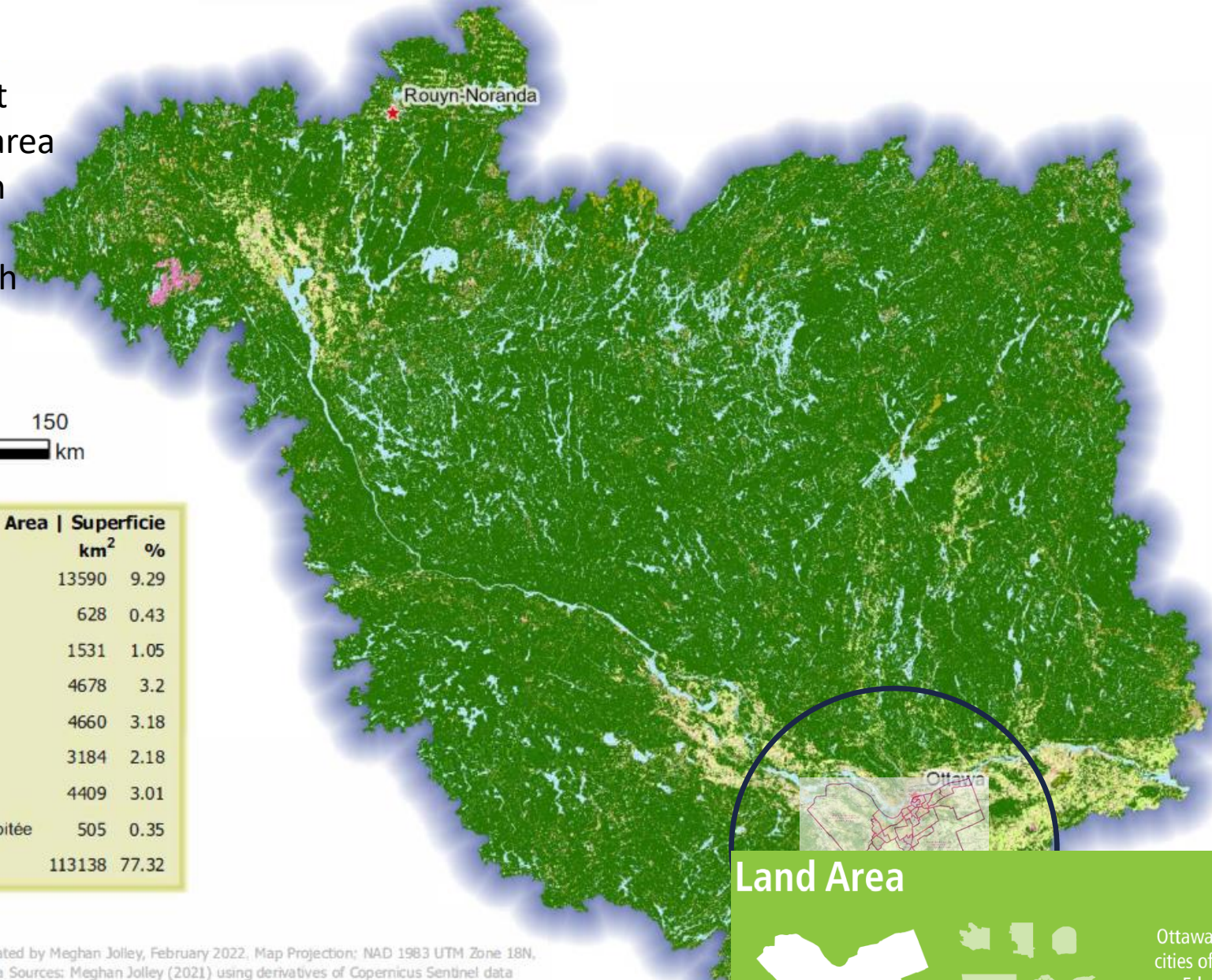


Ottawa River Watershed

- 20 sub-catchment areas
- 14 flow through Ottawa West to East
- 2 additional intersect in downtown area
- 1 additional impacts farthest Eastern portion of Ottawa
- 17 sub-catchment areas flow through Ottawa



Class Classification	Area Superficie	
	km ²	%
Water Plan d'eau	13590	9.29
Residential Résidentiel	628	0.43
Industrial/Infrastructure Industriel/infrastructure	1531	1.05
Wetland Milieux humides	4678	3.2
Agriculture (green) Terre agricole (verte)	4660	3.18
Agriculture (bare) Terre agricole (dénudée)	3184	2.18
Meadow/Fallow Pré/jachère	4409	3.01
Recently Harvested Forest Forêt récemment exploitée	505	0.35
Forest Forêt	113138	77.32



Land Area



Ottawa is **larger** than the cities of Vancouver, Calgary, Edmonton, Toronto and Montréal combined.



Created by Meghan Jolley, February 2022. Map Projection: NAD 1983 UTM Zone 18N. Data Sources: Meghan Jolley (2021) using derivatives of Copernicus Sentinel data (2019-2020)
 Créé par Meghan Jolley, février 2022. Projection cartographique : NAD 1983 UTM Zone 18N. Sources des données : Meghan Jolley (2021) à l'aide de dérivés des données de Copernicus Sentinel (2019-2020)

Recent Freshet Responses

Ottawa River Freshet
OEM operations 1:50
(Rideau River approx.
1:5)

Ottawa River Freshet
OEM operations 1:100
(Rideau River >1:2,
<1:5)

Ottawa River Freshet
OEM Preparedness
COVID 2.0

PWD led Ottawa River
Freshet: Escalation to
OEM Ottawa River
1:20
(Rideau River >1:2,
<1:5)

2017

2018

2019

2020

2021

2022

2023

2024

Ottawa River Freshet
OEM Monitoring and
Preparedness

Ottawa River Freshet
OEM Preparedness
Start of COVID

Ottawa River Freshet
PWD led with OEM
support 1:5

PWD led Ottawa River
Freshet approx. 1:2

City of Ottawa: Office of Emergency Management & Structured Responses

- Corporate Emergency Management Program
- IMS/ICS emergency management systems
- Consistent leadership of emergency responses planned and unplanned
- Defined roles, scalable responses
- Authority to request support from Province if required
- Service, Departmental, Corporate Escalation Criteria
- Freshets historically led by Office of Emergency Management



Internal Flood Preparedness Partners



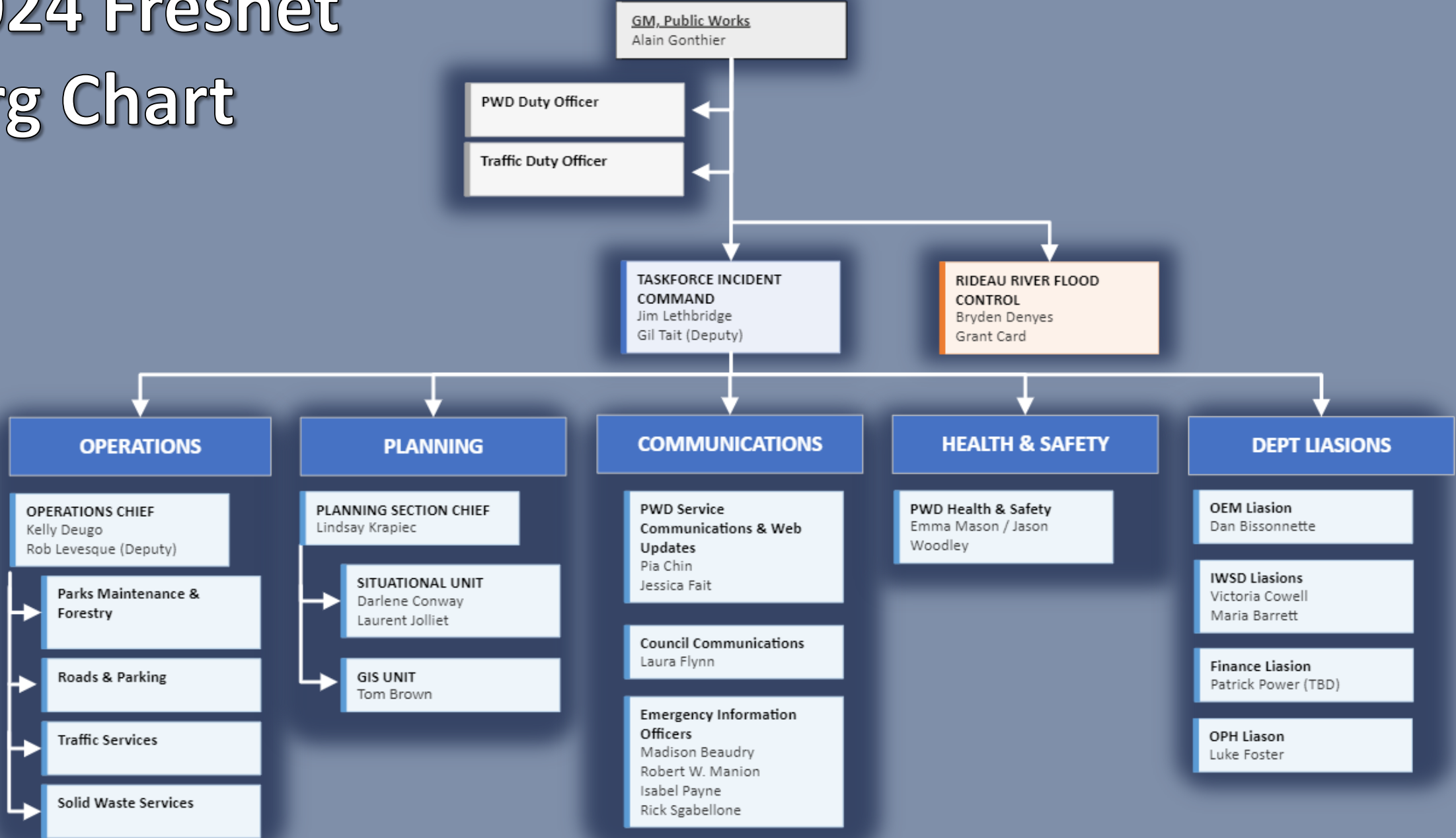
PWD Emergency Planning & Response

A woman is shown in profile, working at a computer workstation. The workstation includes a monitor displaying a blue-toned image, a keyboard, and a mouse. A light blue starburst graphic with the text 'NEW!!' is overlaid on the image.

NEW!!

- Emergency Planning and Response
 - Pilot
- Incident Preparedness & Response Plans
- Operational Freshet formalized -support from OEM as required
- 2024 Freshet planning and response
- Implement structured responses for freshet and future climate emergencies
 - Corporate / Departmental initiatives.
 - Climate Change Master Plan, Climate Resiliency, Strategic Plan, PWD Strategic priorities, UFMP, etc.

2024 Freshet Org Chart



Annual Flood Response



Freshet Monitoring Begins: Snow Data & Water Levels



Rideau River Flood Control & Freshet Task Force Activities



Planning & Preparedness: Water Purification & Neighbourhood Response



Communications & Partner Meetings



Deploy Sandbag Filling Stations



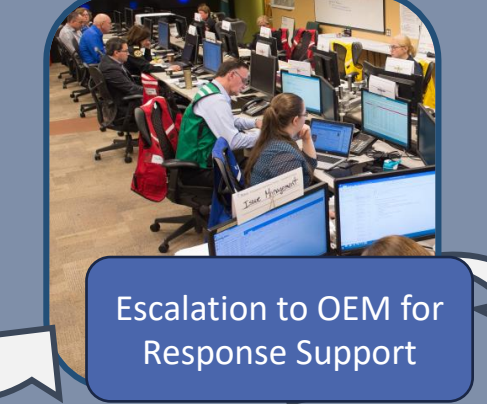
Affected Road & Asset Closures



Ongoing Monitoring, Planning & Communications



Risk of Increased Flooding & Enhanced PWD Ops



Escalation to OEM for Response Support



Resident Supports, Recovery, Demobilization, & Debrief

Flood Mapping on Ottawa.ca



Flood Vulnerable Areas & Structures



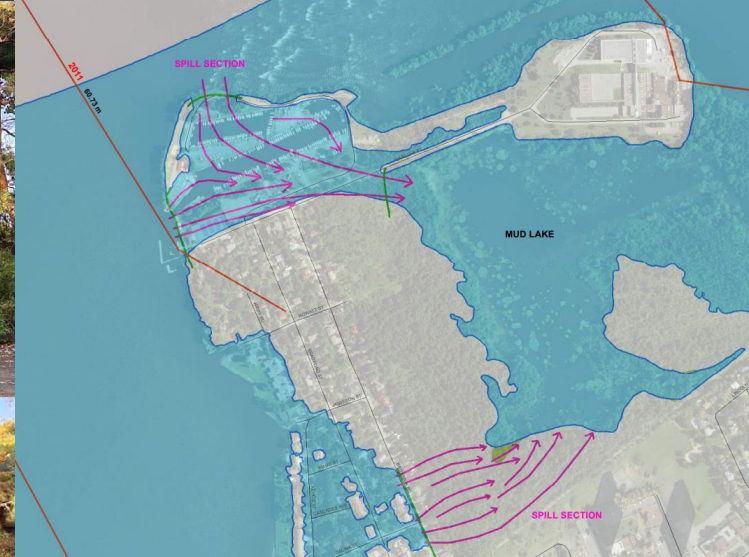
Rideau River flood storage i.e., Brantwood Park

Brewer Park berm & barrier

Carleton U. flood preparedness plan

Maintaining wetlands for flood protection

River Rd. as flood protection

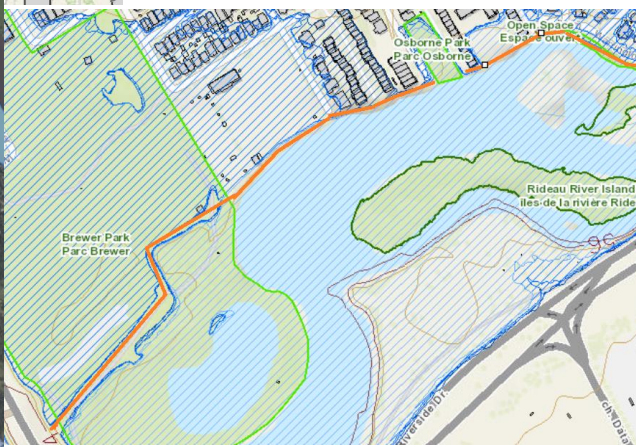


Cassels Road / Britannia WPP access at risk > 1:50 flooding

Birchdale Ave., Jamieson St. & Rowatt St. flood barriers

Britannia Flood Protection Berm

NCC Railway & Belltown Vulnerability



Innovations

2017-2019:

- OEM led IMS structured responses for spring freshet
 - Resident supports
- Volunteer management
- Debris management

2020:

COVID

- Sorting operation and community deployment of filled sandbags (pay it forward)

2022:

- Ongoing collaborations with CAs, flood mapping improvements
- Permanent river monitoring gauge installed at Cumberland with RVCA
- IMS 209 monitoring improvements

2024:

- Ongoing collaborations with CAs, additional product reviews
- Increased ability to review small waterway flood mapping and impacts
- Climate resiliency impacts being developed
- Increased awareness of provincial post-emergency reports and recommendations

2019:

- Development of flood vulnerable area consultant tool for Ottawa River/ lower Rideau River
- Debris Management Strategy developed
- Sandbag processing completed
- Storage created for future events

2021:

COVID

- Improved website and social media, changes to CA and ORRPB websites

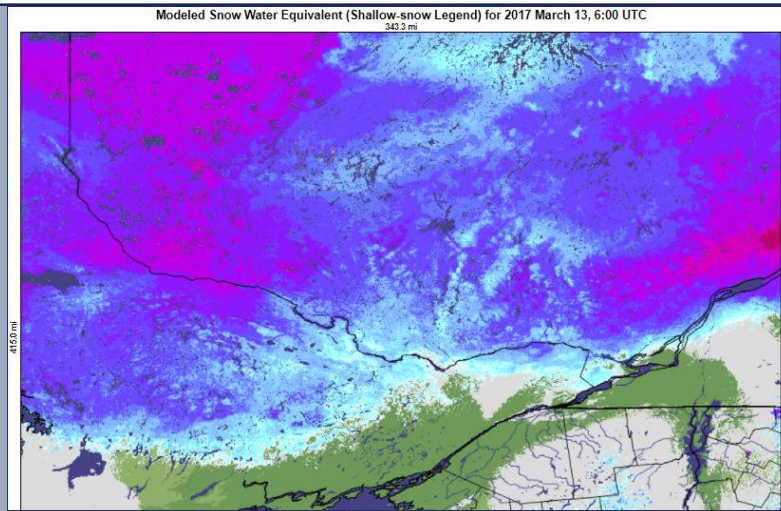
2023:

- Flood mapping now available year-round
- Drone surveys piloted
- Emergency sea cans deployed for first time
- Improvements to centralized tracking
- Centralized asset replenishment and recovery operations by PWD
- Community-based volunteer support strategy piloted

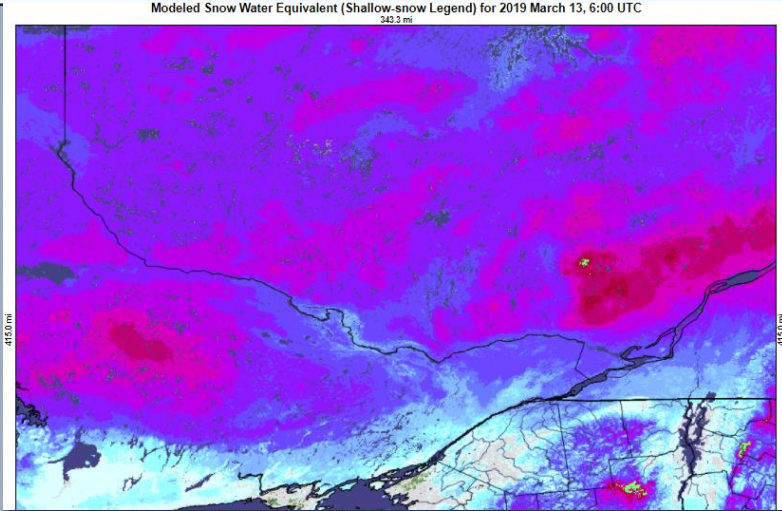
Flood Vulnerability Awareness

2. CONTINUOUS GAUGES ON THE OTTAWA RIVER										
Owner	Location	MVC / RVCA Model River Station	Water Elevation (m)						Onset of Flooding	Real Time Data
			2yr ₁	5yr	10yr	20yr	50yr	100yr		
OPG	Chats Lake									
MVC	Constance Bay	2043	59.50	59.91	n/a	60.38	60.65	60.85	59.50	http://mvc.on.ca/water-levels/
WSC	Britannia Bay	2014	59.44	59.84	60.08	60.29	60.55	60.74	60.08	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02KF005
	Ottawa River below Chaudière Falls	1045.2	43.95	44.87	45.45	45.97	46.62	47.08	n/a	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02LA028
	Ottawa River at Hull Marina	1043.1	43.62	44.35	44.71	45.16	45.65	46.00	n/a	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02LA015
RVCA	Cumberland ferry	1007	42.56	43.17	43.48	43.87	44.31	44.62	43.17	https://his.rvca.ca/rvcawfl/charts/REALTIME_Q/FFW_CUMBERLAND_PUBLIC_HG.html
			Flow (cms)							
OPG	Chats Falls		3180	4020	4560	5070	5700	6180	4560	TBC
WSC	Britannia	2014	3180	4020	4560	5070	5700	6180	4560	Britannia Ottawa River Regulation Planning Board
Hydro-Québec	Carillon Dam ² and Cumberland Ferry	1007	5160	6280	7010	7700	8580	9240	6280	Carillon Ottawa River Regulation Planning Board ²

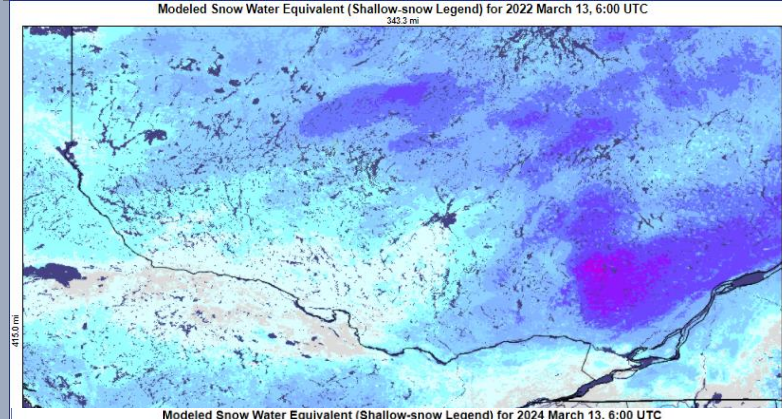
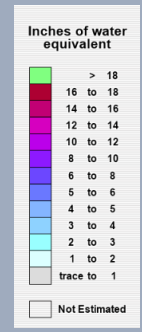
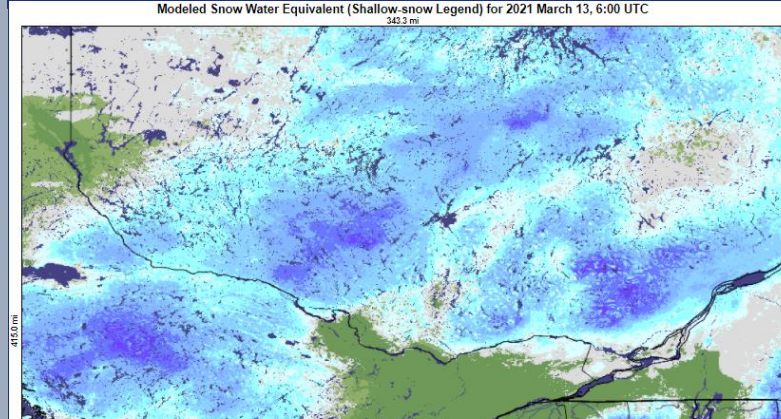
2. CONTINUOUS GAUGES ON THE RIDEAU RIVER											
Owner	Location	RVCA Model River Station	Water Elevation (m)						Onset of Flooding	Real Time Data	Geodetic Offset ₂ (m)
			2yr ₁	5yr	10yr ₁	20yr	50yr	100yr			
PC	Rideau River at Becketts Landing	15855	86.13	86.54		86.95	87.16	87.31	FVAs outside City limits	https://www.pc.gc.ca/apps/waterlevels/donnees-data?id=204&lang=en&sitelid=100372	n/a
RVCA	Rideau River at Baxter	8450	86.11	86.52		86.93	87.14	87.29	5 year	https://his.rvca.ca/rvcawfl/charts/REALTIME_Q/FFW_BAXTER_PUBLIC_HG.html	n/a
WSC	Rideau River below Manotick	13530	80.58	81.13		81.48	81.67	81.99	n/a	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02LA012	75.00
WSC	Rideau River at Ottawa (Carleton)	10168	59.43	60.04	60.14	60.45	60.64	60.75	20 year ³	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02LA004	54.849
RVCA	Brantwood Park	5924	57.29	57.73	57.9	58.09	58.25	58.34	5 year	https://his.rvca.ca/rvcawfl/charts/REALTIME_Q/FFW_BRANTWOOD_PUBLIC_HG.html	n/a
WSC	Rideau River above Rideau Falls	343	54.56	54.92	54.96	55.16	55.27	55.34	n/a	https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=02LA027	49.40
Flow at Carleton University ⁴			Flow (cms)								
		10168	369	475	529	572	617	644			



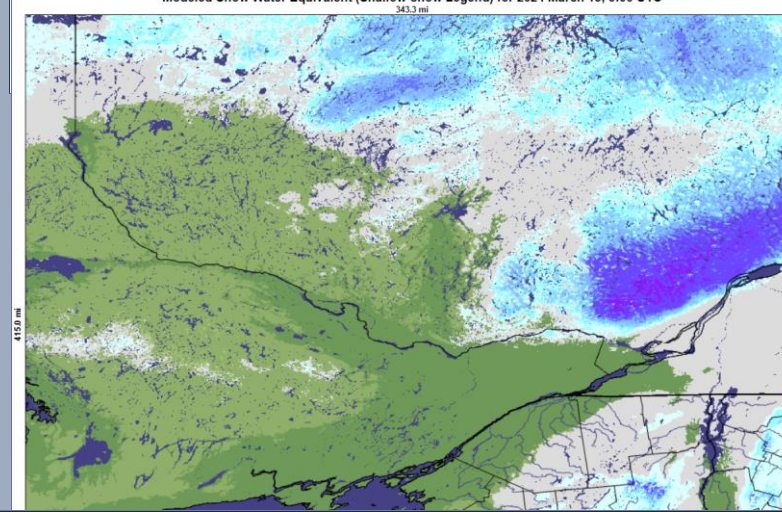
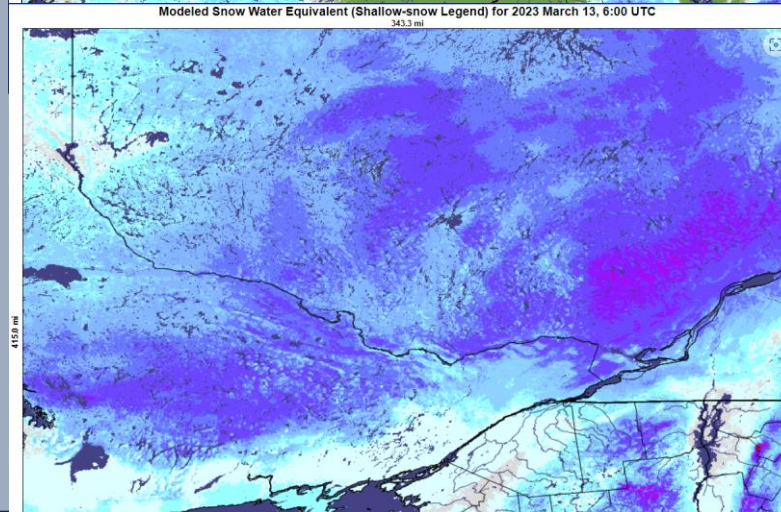
Shallow Snow-Water Equivalent Mar 13



1:50 / 1:100



<1:5 / 1:5



1:20 / 1:5

Source:
National
Operational
Hydrologic
Remote
Sensing
Centre
(NOHRSC)

Chat's Lake Elevations

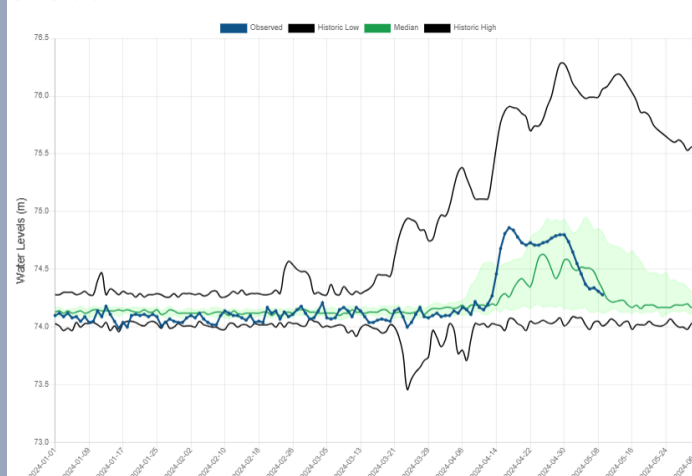
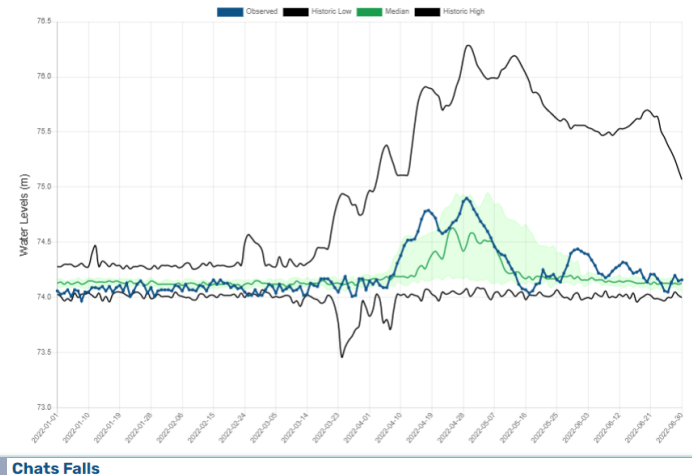
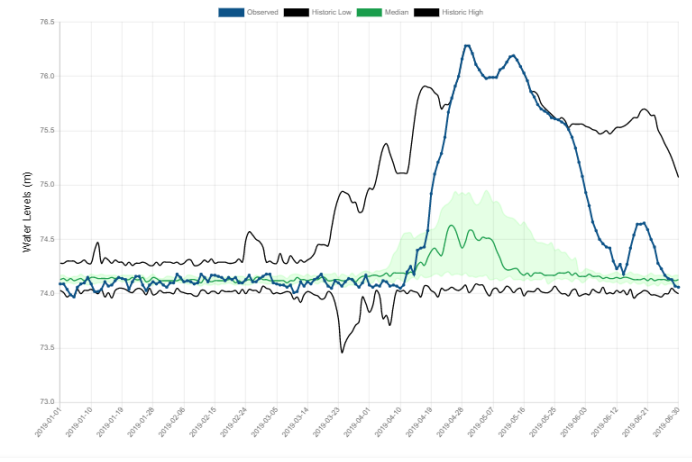
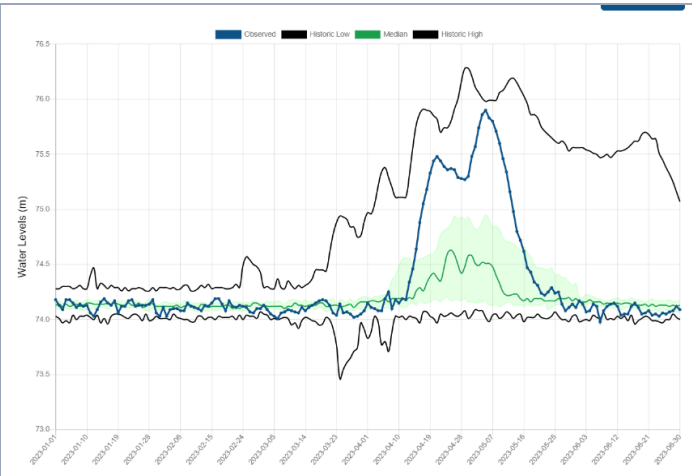
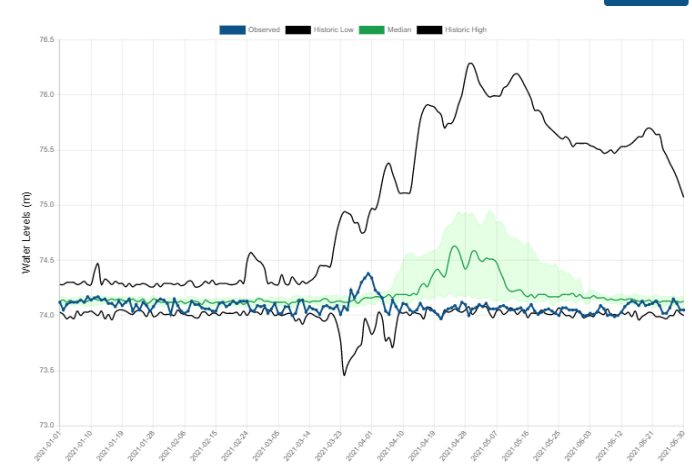
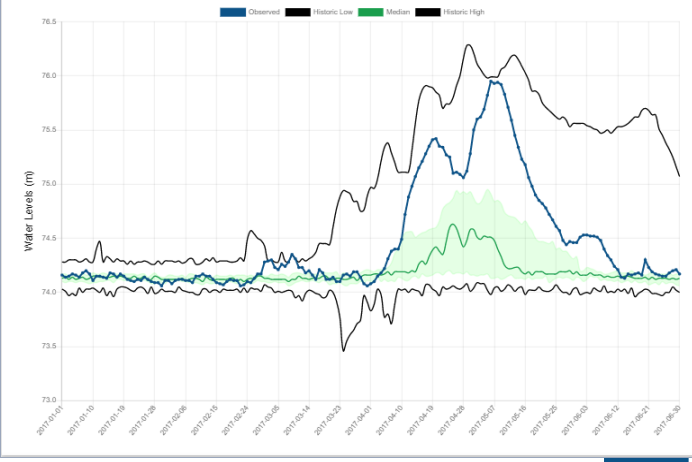
Jan 1 – June 30

2017, 2019, 2021, 2022, 2023, 2024

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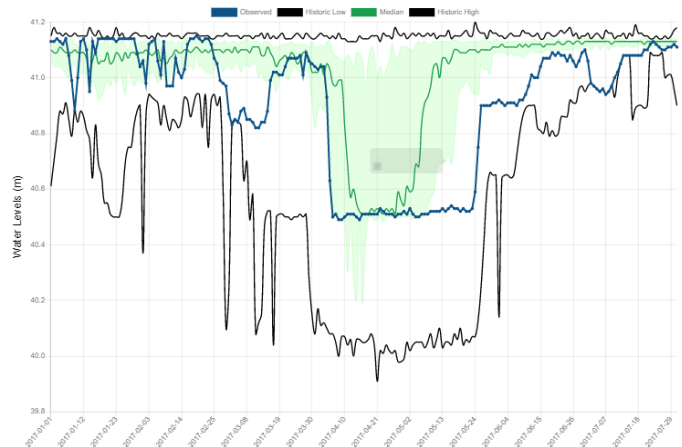
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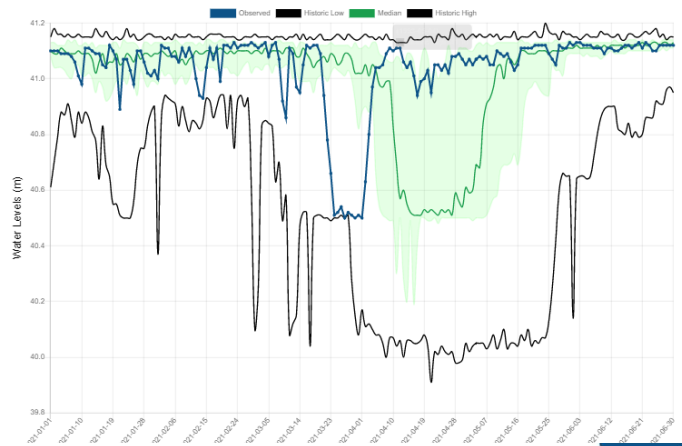


Source:
Ottawa
River
Regulation
Planning
Board

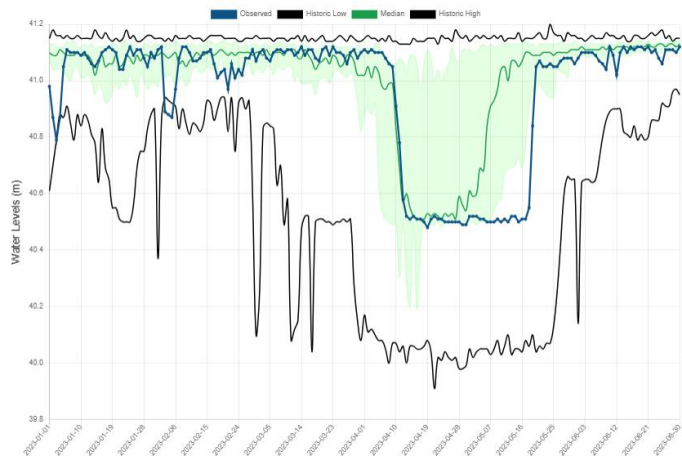
Carillon Elevations Jan1-June30: 2017, 2019, 2021, 2022, 2023, 2024



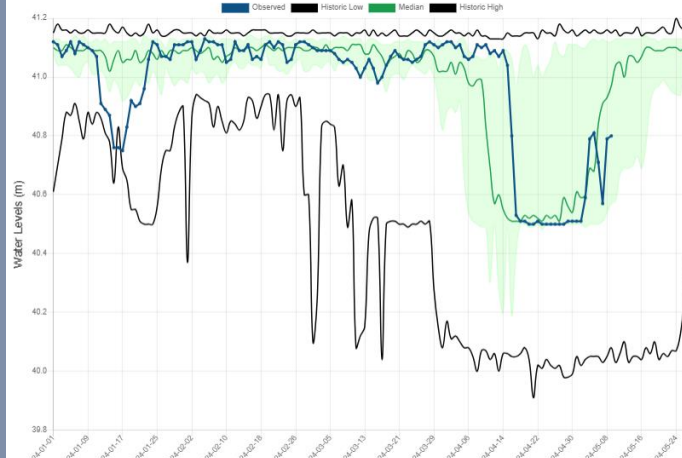
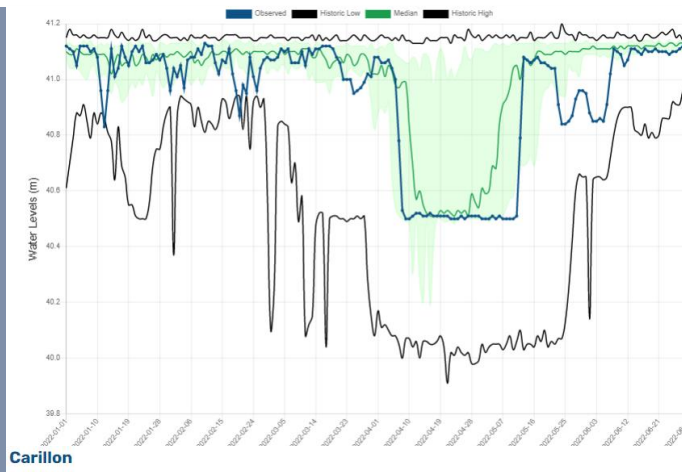
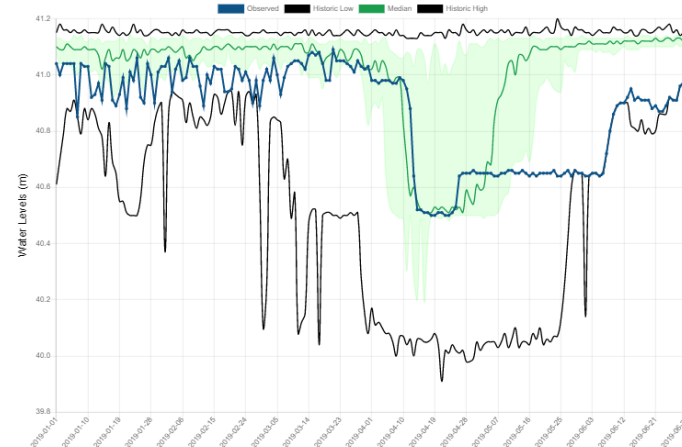
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1:20 / 1:5



Source:
Ottawa
River
Regulation
Planning
Board

Current Collaborations

- Standard communications, Common language by CAs
- Strong CA relationships / Primary flood contacts
- Local waterway flood warnings i.e., Kenmore & North Gower
- CA coordinated presentation for City of Ottawa
- CA mapping improvements & amplification on Ottawa.ca
- Presentations by water managers to City and residents i.e., Ontario Power Generation and Ottawa River Regulatory Secretariate
- Clarification of flood messaging / terminology during flooding. I.e., Significant flooding
- Additional products to City by CAs
- Partnerships to improve monitoring/reporting of elevations, flows, snow, weather, etc.



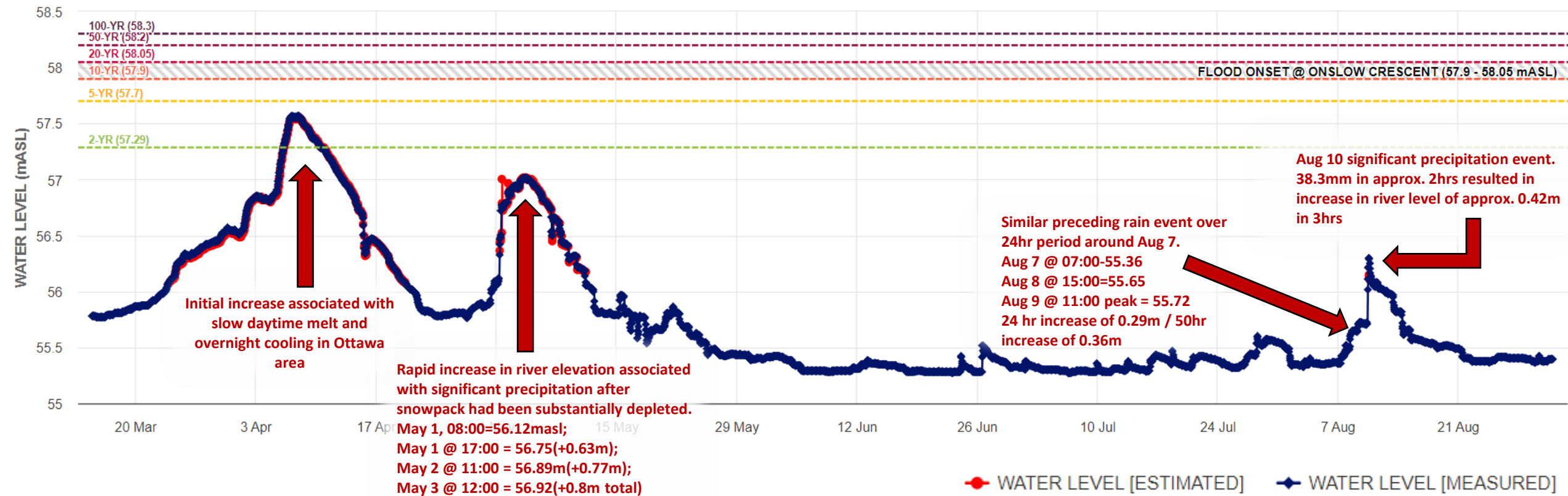
Ongoing Work... Emergency Planning



- Critical infrastructure protection plans: refinements and improvements
- Future water management strategies and planning by CAs and others
- Responses to river-related emergencies beyond the typical freshet season
 - i.e., Kiamika Dam situational awareness tool 2023
 - Late flow along the Gatineau River 2022
- Improving understanding of responsiveness of local waterways (next slide)

Understanding The Changing Climate

Rideau River @ Brantwood Park (RVCA) – Water Level - 2023 Source Data: Rideau Valley Conservation Authority



Ongoing Internal Work

- Improved central flood information resource for residents – www.Ottawa.ca
- Wet weather programs
- Shared awareness of pluvial flood risks related to stormwater systems, holding capacity, inlet control devices
- Improvements to 311 resident reporting / intake
- Improvement in understanding of small waterway responsiveness
- Ongoing flood mapping updates for resident access on City website
- Lifecycle replacement / upgrade of roads within 1:100 flood plains
- Review & maintenance of existing engineered flood protective berms

Ongoing Work: Communications



- Develop community specific information: Improve resident understanding of flood risk, historical data and interpretation
- Encourage and support personal & community preparedness (collaboration with Public Safety)
- Clarify city services offered during riverine flood responses
- Improve pluvial flood communications
- Related communications for other severe weather events

Questions ?

Jim Lethbridge

City of Ottawa – PWD EP&R

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