

Beyond the Forecast: Communicating Flood Risk in the Toronto Region

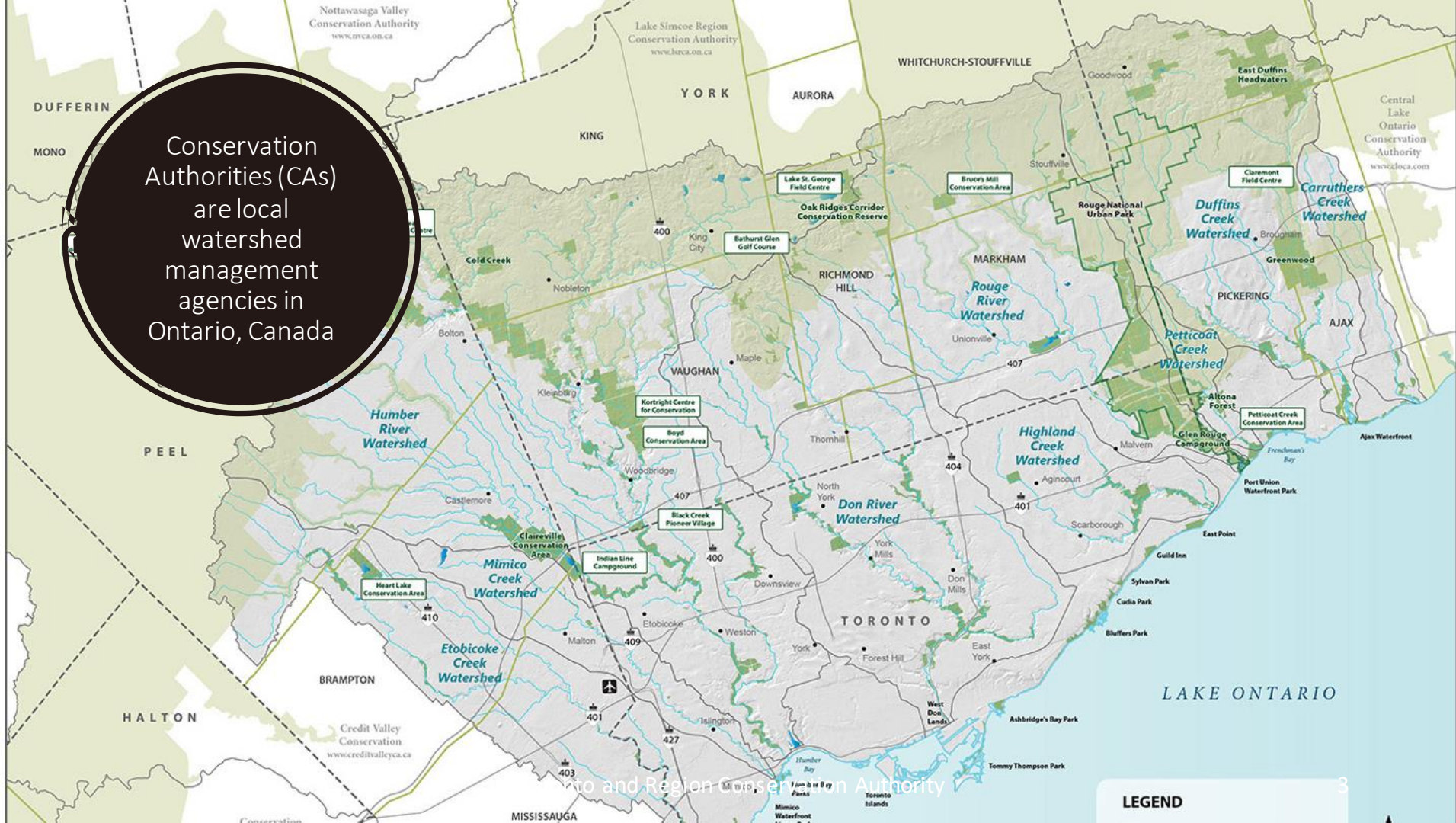
FEWS User Days – November 2020

Rehana Rajabali, P.Eng, MUDS
Associate Director, Engineering Services
Toronto and Region Conservation Authority

Presentation Outline

- Conservation Authorities and integrated flood risk management
- The differences between risk communication and crisis communication
- Where forecasting and FEWS fit in
- Priming audiences to make crisis communication effective

Conservation
Authorities (CAs)
are local
watershed
management
agencies in
Ontario, Canada



LEGEND

PREVENTION & MITIGATION

Limiting exposure to risk:

- Implementing TRCA's regulations and policies

Reducing risk:

- Operating a flood forecasting and warning program
- Maintaining flood control infrastructure
- Creating a flood protection strategy for vulnerable areas
- Implementing remedial works projects

Understanding the risks:

- Climate, geology, watershed response and potential for climate change

Documenting the risks:

- Floodplain mapping, identification of flood vulnerable areas

RECOVERY

- Flood event documentation and lessons learned
- Storm analysis

Integrated Flood Risk Management

PREVENTION
& MITIGATION

RECOVERY

PREPAREDNESS

RESPONSE

PREPAREDNESS

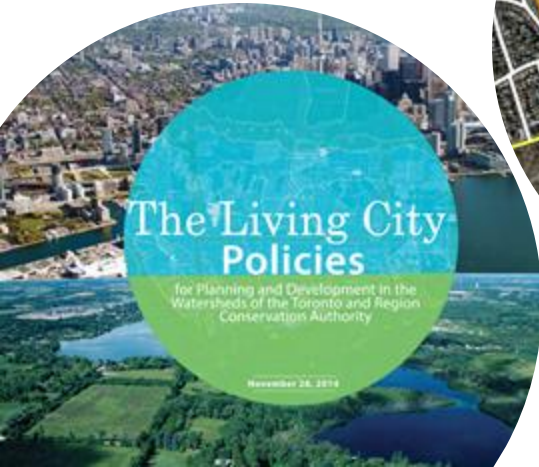
- TRCA's Flood Contingency Plan
- Emergency Plans
- Emergency Operations Centre
- Training
- Public Education

RESPONSE

- Provide Flood Forecasting and Warning (issuing flood messages)
- Operate flood control infrastructure
- Communicate information and advice
- Data management

Prevention and Mitigation

- Floodplain mapping and the engineering studies that support it
 - Hydrology
 - Hydraulics
- Flood Risk Assessment
- **Land Use Management**
 - **Stormwater Management**
 - **Land-Use and Development Regulation**
- Flood Control Infrastructure
 - e.g. G. Ross Lord Dam
- Capital works for flood protection
 - e.g. Port Lands Flood Protection

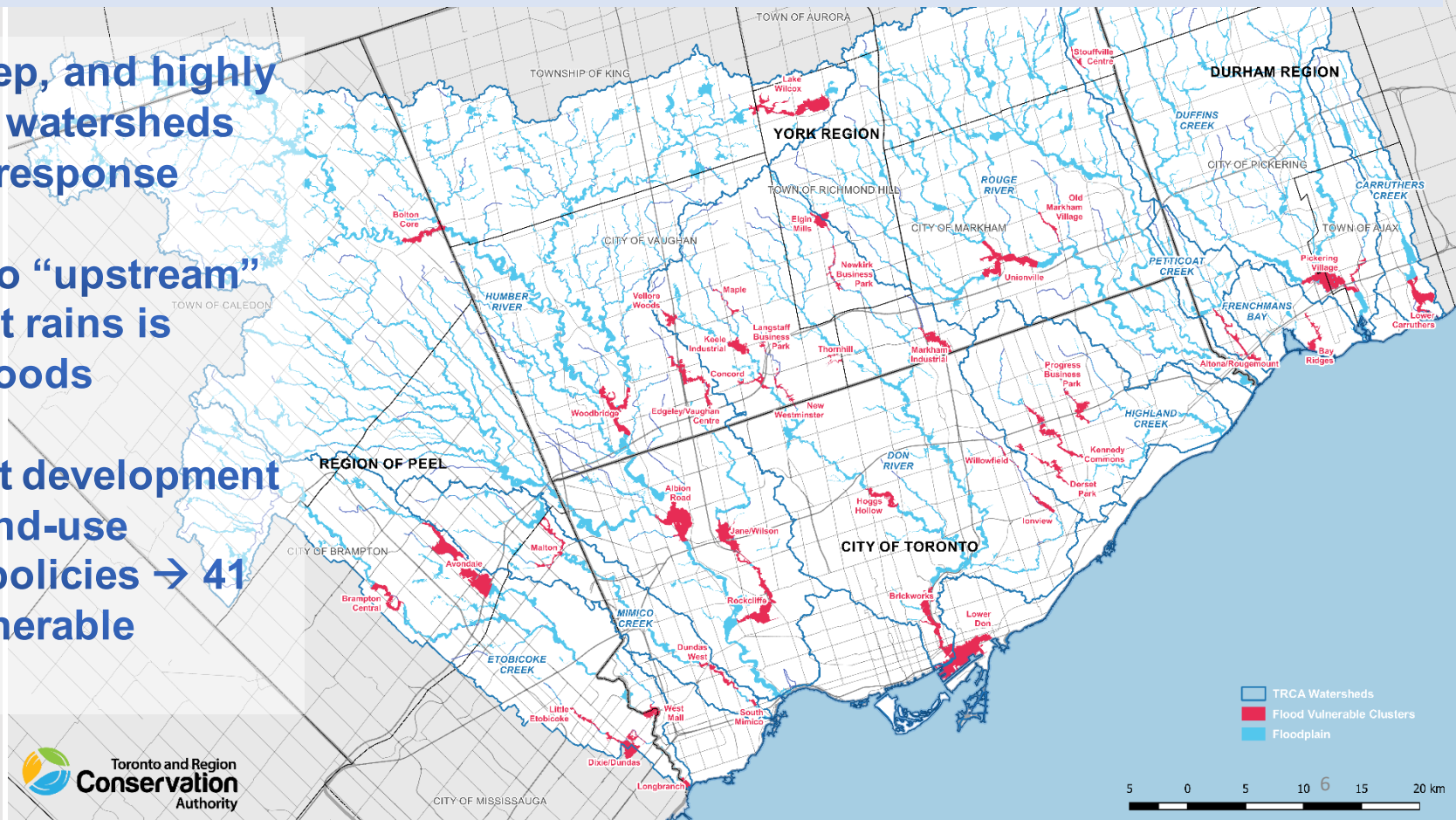


Our highly urbanized watersheds

Small, steep, and highly urbanized watersheds
→ Flashy response

There is no “upstream”
→ Where it rains is where it floods

Significant development prior to land-use planning policies → 41 Flood Vulnerable Clusters



Preparedness

- Emergency Management Planning
 - Flood Contingency Plan
 - Municipal emergency plans
 - IMS structure
- Training
 - Flood Duty Officer training
 - IMS training
 - Partnership with municipalities
- Public Education
 - Emergency Preparedness Week
 - Flood preparedness curriculum partnership with Education
 - Flood Risk Outreach Strategy
 - Floodplain information on the web



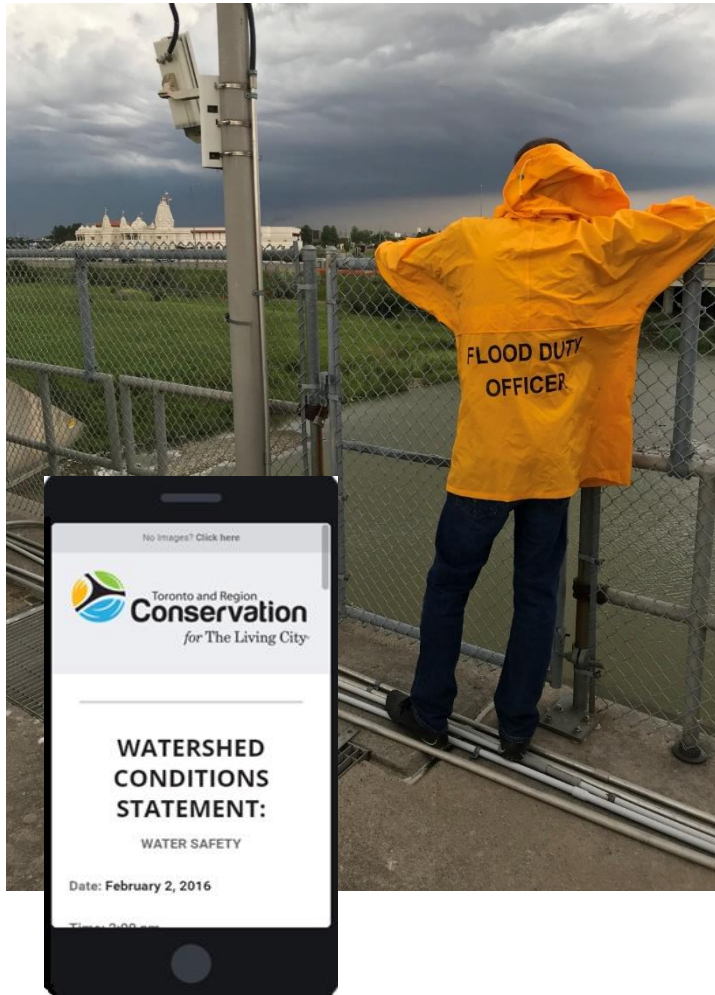
Flood Response

Conservation Authorities

- **Monitor** watershed and weather conditions and operate a **flood forecasting and warning system**
- **Issue** Flood Messages
- **Operate** Conservation Authority dams and flood control structures
- Provide **technical advice** to municipalities
- Maintain communications with municipalities and other agencies

Municipalities

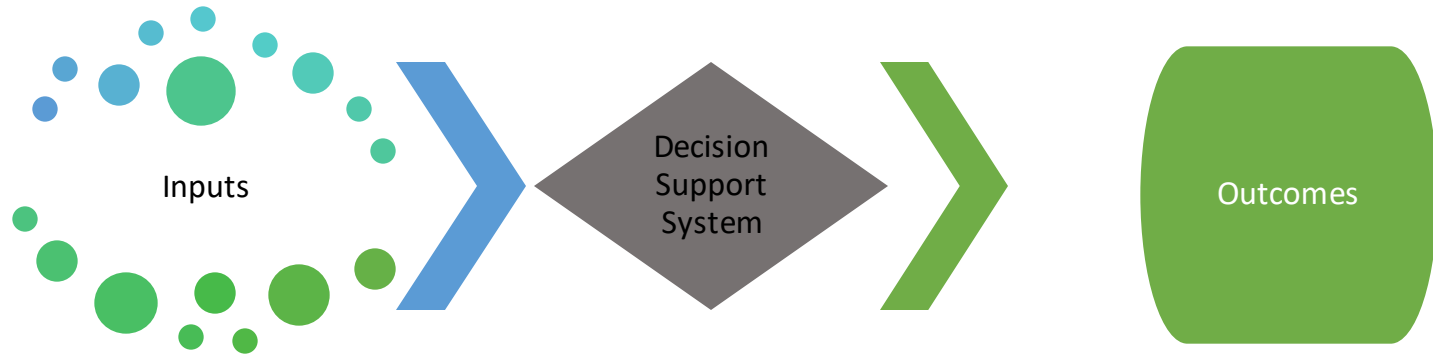
- **Notify** appropriate municipal officials, departments and agencies.
- Determine the appropriate response and **deploy municipal resources** to protect life and property.
- If required, **declare a flood emergency** and implement their emergency response plan.
- **Request provincial assistance** if needed



- Impact Tracking
- Post-event analysis
- Data collection
- Lessons learned



Where FEWS/Decision Support Systems come in

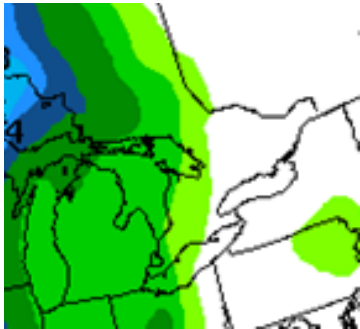
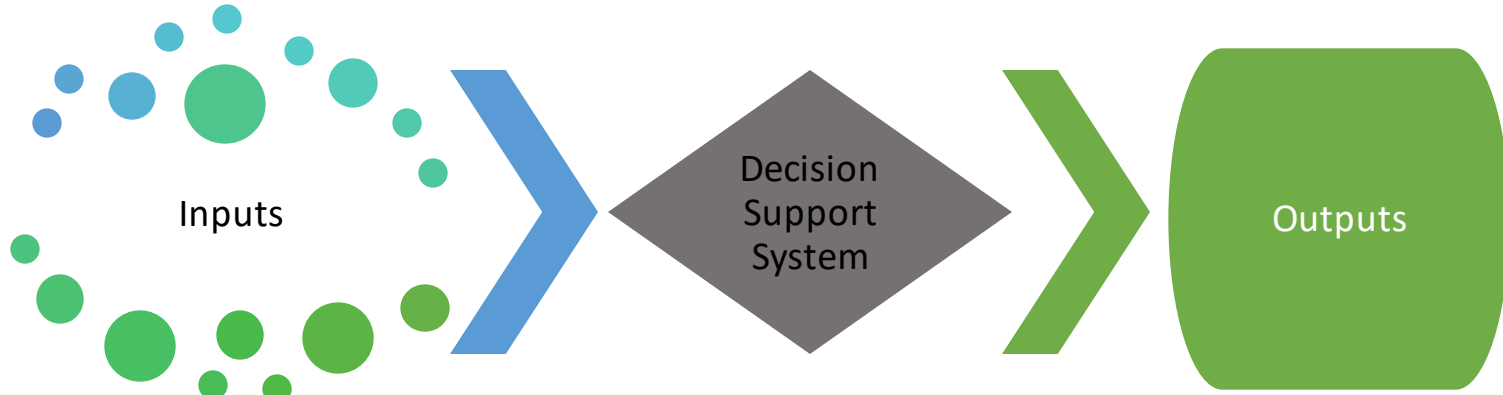


- Current streamflow / WL / SWE
- Received Precipitation
- Forecast Precipitation
- Radar
- Forecast Temperature
- Thunderstorm parameters

- Brings together the inputs
- Supports the analysis and the decision
- Documents the decisions

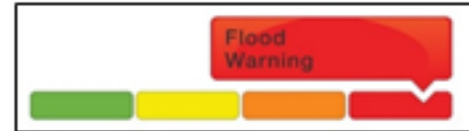
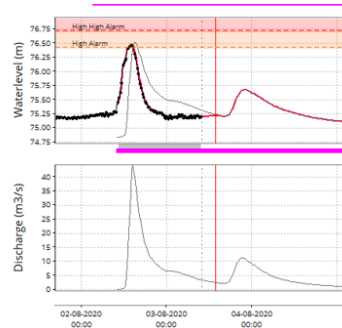
- Is there a threat of flooding?
- What level message do we issue?
- What info do we need to provide to municipal partners?
- Dam operations (TRCA only has two dams and they are exclusively for flood control (reservoirs are empty until filled by a storm))

Distilling data into key messages



**ANTECEDENT MOISTURE CONDITIONS
for September 2020**

PE Value for month	1.88		
Total Precipitation:	108.29	mm	
DAY	PRECIPITATION (mm)	S	RUNOFF (mm)
		20.45	
1	21.2	10.39	9.27
2	23.9	4.09	15.72
3	37.0	1.88	32.91
4	0.4	3.36	0.00
5	0.0	5.18	0.00
6	11.1	3.06	7.10
7	0.3	4.64	0.00
8	1.2	5.32	0.00
9	0.9	6.26	0.00
10	0.2	7.94	0.00



TRCA Flood Message Types



High flows, unsafe banks, melting ice or other factors that could be dangerous for recreational users such as anglers, canoeists, hikers, children, pets, etc. Flooding is not expected.



Early notice of the potential for flooding based on weather forecasts calling for heavy rain, snow melt, high wind or other conditions that could lead to high runoff, cause ice jams, lakeshore flooding or erosion.



Flooding is possible in specific watercourses or municipalities. Municipalities, emergency services and individual landowners in flood-prone areas should prepare.

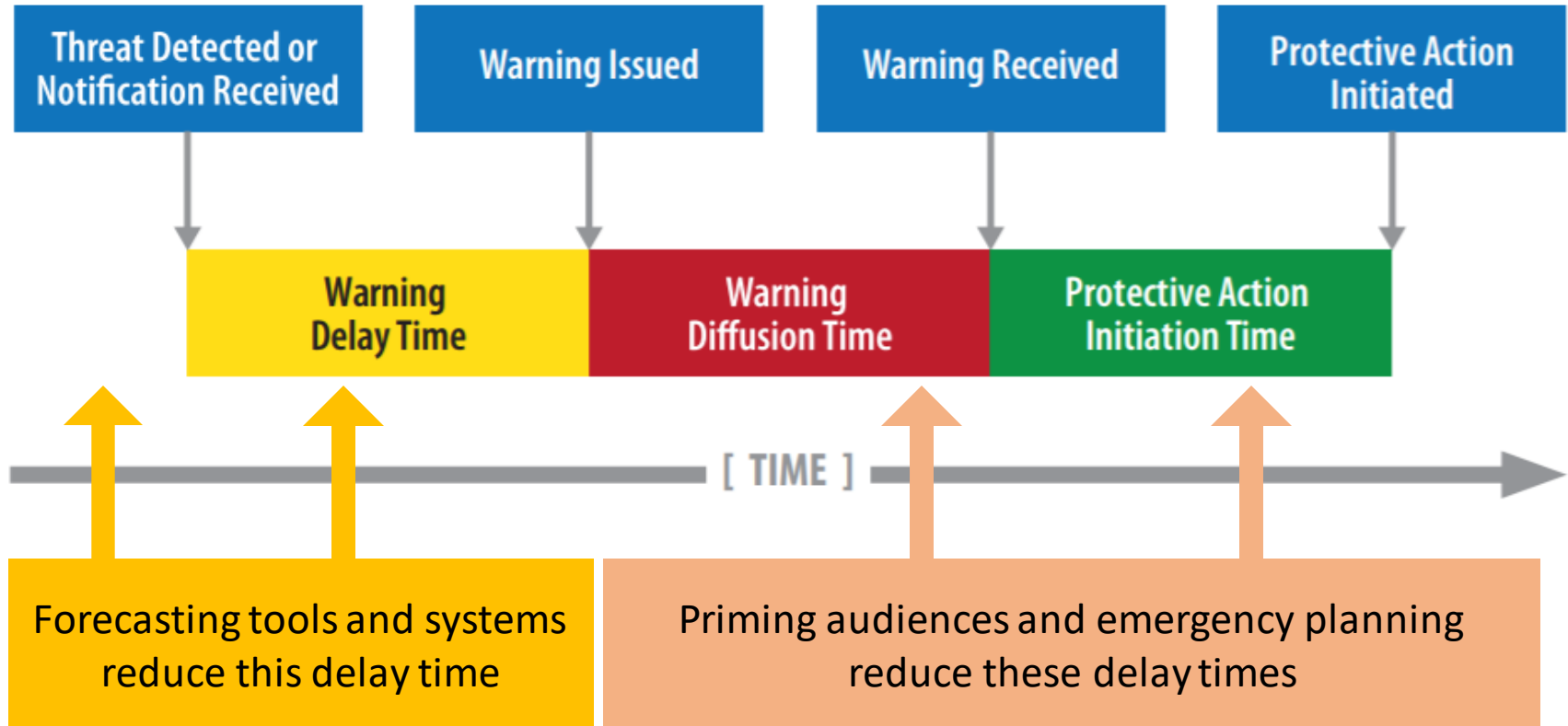


Flooding is imminent or already occurring in specific watercourses or municipalities.



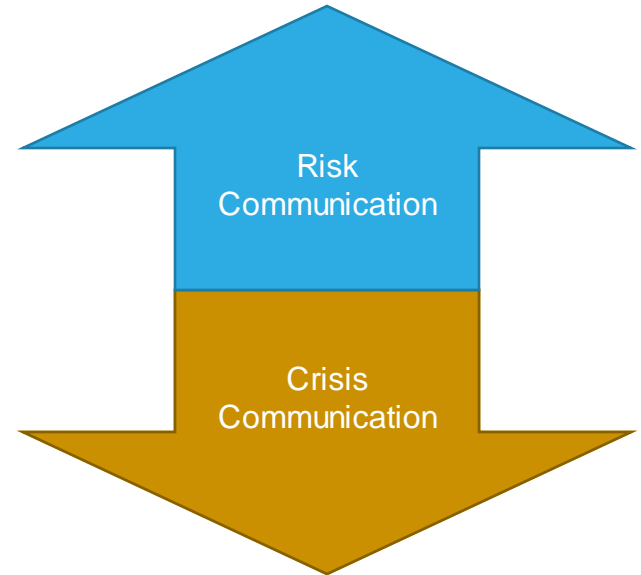
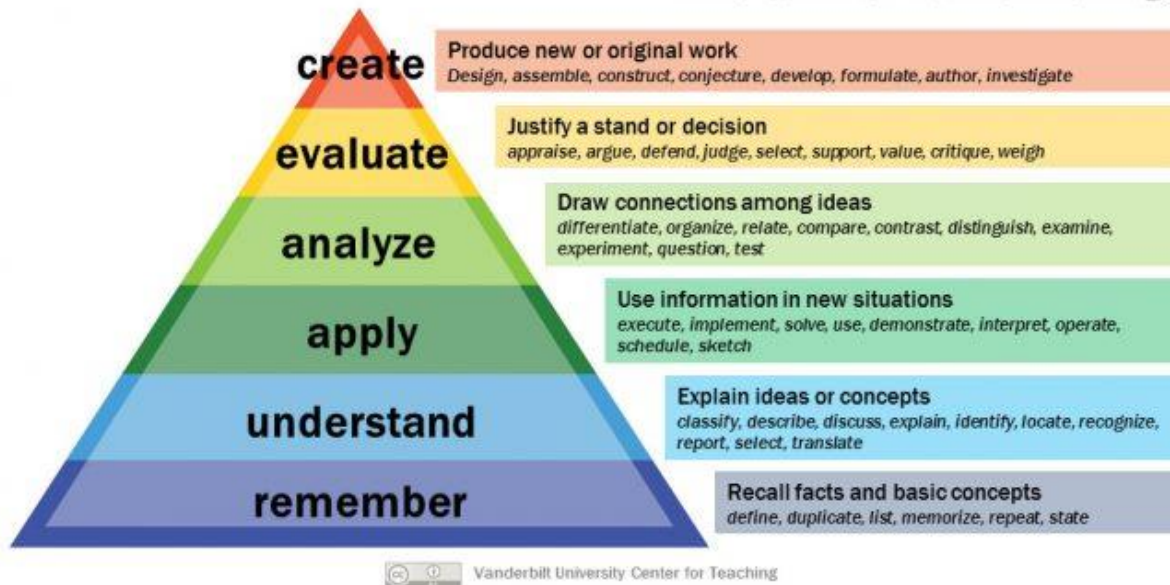
A notice that critical high Lake Ontario levels and/or waves are imminent and/or occurring, which could result in shoreline flooding and/or erosion

We can't change the weather, but we continue to work towards reducing the threat to public safety



Risk Communication vs Crisis Communication*

Bloom's Taxonomy



*I first came across the concept of applying Bloom's Taxonomy to risk communication in a presentation by Ronda Oberlin, City of Lansing, MI

**Many people inhabiting
flood-prone communities
are not fully aware of the
risks to themselves and
their property.**

Thistlethwaite et. al., 2017

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- Communicate information and advice

...but we have many touchpoints
with these audiences |

Flood Risk Outreach Program and Site-Specific Flood Response Plans

- Priming our municipal partner emergency management officials
- Priming members of the public who live in flood vulnerable areas



Toronto and Region Conservation Authority

Flood Plain Map Viewer

Toronto & Region Conservation Floodplain Viewer

ArcGIS World Geocoding Service



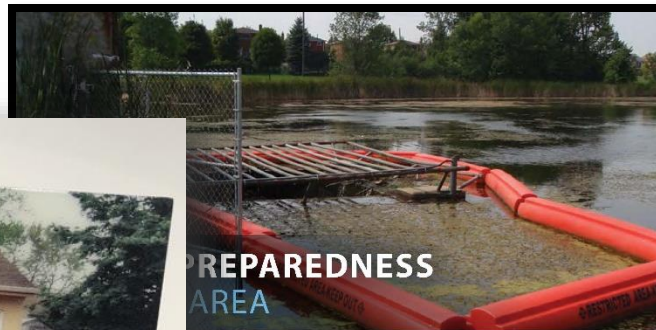
-79.654 43.676 Degrees

Garmin, INCREMENT P, NGA, USGS, NRCan

Risk communication takes many forms



Advertisements



Conservation Authority (TRCA) invites business owners and residents business downstream from Stouffville Dam, along Stouffville Creek, to a put the Dam Emergency Preparedness Plan and general flood readiness.

OPEN HOUSE

7pm - 8:30pm
Witchurch-Stouffville

house with information
to answer questions
ations

house with information
to answer questions



This event is open to all interested parties. You can register to attend at trca.ca/flood-risk-stouffville-centre or simply drop in.

Learn more: trca.ca/flood-risk-stouffville-centre | Follow us: @TRCA_flood
Sign up to receive flood messages: trca.ca/floodmessages



Advertisements

Geotargeted Social Media Campaigns




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Not to alarm you, but you may live in an area at risk for river flooding! We can help you become better prepared.




TRCA.CA
Are You Prepared? [LEARN MORE](#)
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You may live in an area at risk for river flooding!
We can help you become better prepared to protect what matters most to you.



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WHO DO I CALL WHEN I SEE FLOODING?



Private drainage and surface water

The property owner is responsible for private drainage. Contact your **insurance representative** for any property related damage due to flooding. Consider adding other types of flooding coverage to your policy as necessary.

Residents and businesses near watercourses

If your property runs adjacent to a watercourse, you are responsible for reporting incidents such as blockage and flooding. To report incidents and flood risk issues, contact your **local conservation authority**.

Sanitary sewer back up services

Most backups occur when the sewer pipe that runs from your home to the Region's main sanitary sewer pipe is blocked by items such as roots or grease, or overwhelmed by volume. If you have a sewer backup in your home, call your **regional municipality**.

Urban flooding

The volume of water generated from a heavy downpour can sometimes cause storm drainage systems to breach their capacity, resulting in the excess water flowing overland along major drainage systems such as roads.

If you have a problem with the storm sewer in your neighbourhood, (pooling of water at the catch basin) call your **local municipality**.

For hydro or natural gas related questions, including safety tips for flooding, contact your **local utility provider or the Electrical Safety Authority**.

If you are in danger call **911** immediately.



Public Open Houses

Digital flood handbooks

Do You Live in an Area at Risk of Riverine Flooding?

USE OUR MAP VIEWER TO FIND OUT

If you're not sure whether your home is in a floodplain, use TRCA's map viewer to find out. Just enter your address in the search bar. If your home lies within the shaded areas, you could be at risk of flooding.



Quick Navigation

NEW! VIEW RESOURCES FROM OUR OPEN HOUSE

1. KNOW YOUR RISKS ▾

Do You Live In An Area At Risk Of Riverine Flooding?

Understanding Flood Risk In Bolton

What Types Of Flooding Can Affect Bolton Residents?

Flooding In Bolton Can Happen At Any Time Of Year

Flood Protection In Downtown Bolton

How Will I Know If Flooding Is Forecasted?

2. BE PREPARED

3. STAY INFORMED ▾

Information Sources

Social Media Alerts And Notices

Additional Resources

**FLOOD MESSAGE
SIGN UP FORM**

Follow TRCA Flood



LIVING IN A FLOOD VULNERABLE AREA: DOWNTOWN BOLTON

HOME » CONSERVATION » FLOOD RISK MANAGEMENT » LIVING IN A FLOOD VULNERABLE AREA: DOWNTOWN BOLTON

SHARE: [f](#) [t](#) [g+](#)

Notice of Construction

Toronto and Region Conservation Authority (TRCA) will begin work on the Bolton Berm Major Maintenance Project Phase I in September 2020.

LEARN MORE

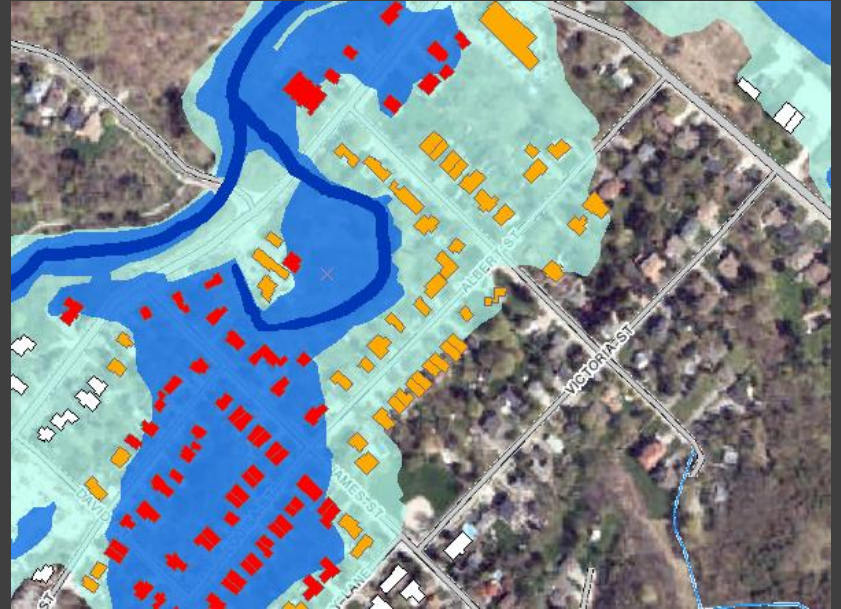
NEW!

In January 2020, Toronto and Region Conservation Authority (TRCA) hosted an open house information session to help residents and businesses in downtown Bolton become better prepared for flood risk. To learn more about riverine flooding in Bolton, just check out the resources from the open house below.

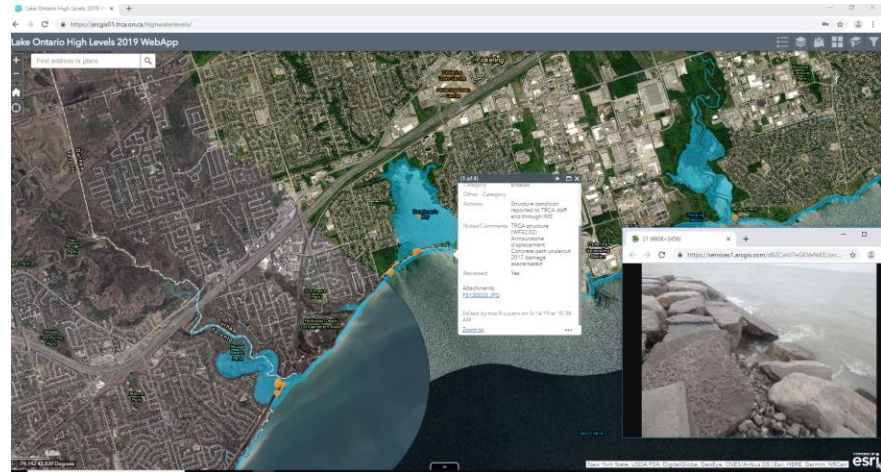
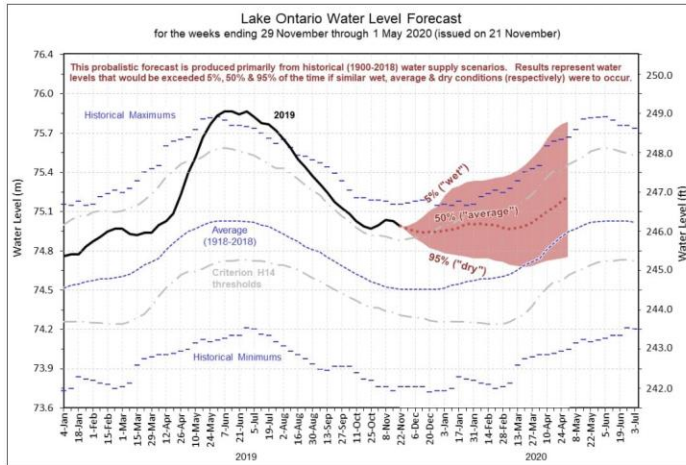
**VIEW OPEN HOUSE
PRESENTATION**

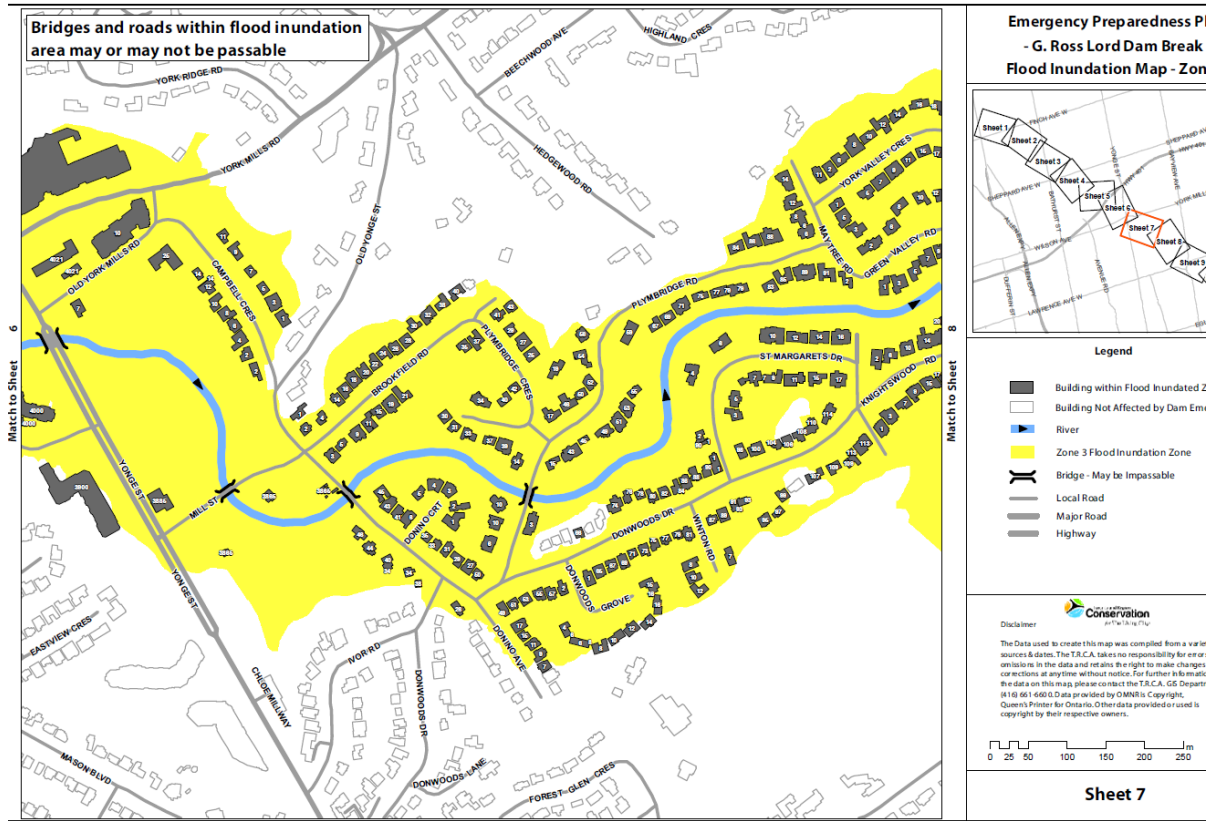
**VIEW QUESTIONS AND
ANSWERS**

For our first responders, a map is better than a hydrograph, and a list of addresses is even better



Many audiences want a binary answer, some can cope with uncertainty

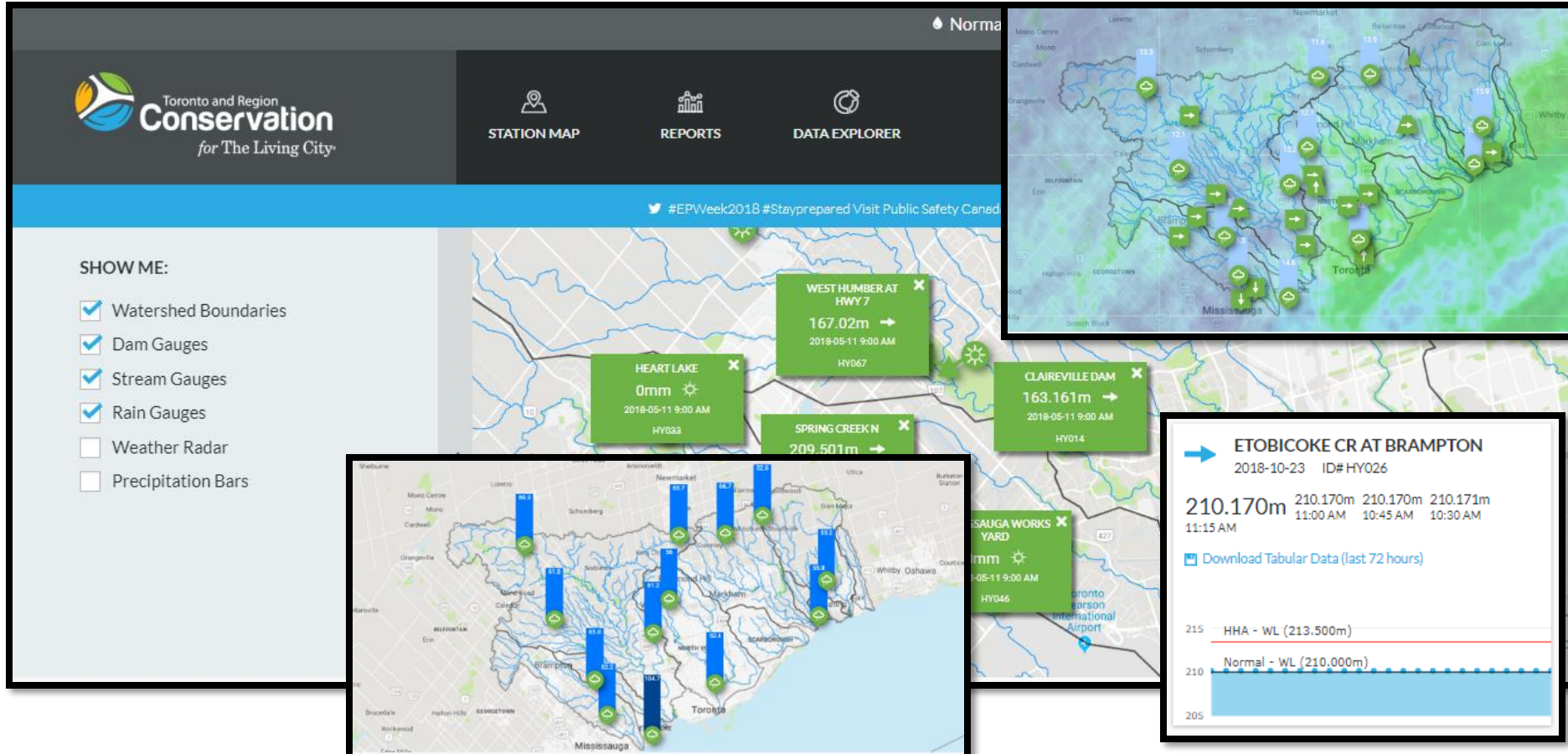




10 scenarios
reduced to
three zones –
precision will
be lost in
favour of
simplicity

For the sophisticated user, share the data, exchange the data

trcgauging.ca



Parting thoughts – what we are working on now..

- Warning messages and pro-active communication with audiences should reference a shared vocabulary/understanding – has that been established?
- Consider the outputs you need for your (various) flood warning audiences to include in your decision support system (FEWS) workflows
- While warning messages may be one-directional, how can public feedback be incorporated into situational awareness tools?

Thank you!

Questions?

Rehana.Rajabali@trca.ca

www.trca.ca