

Item for the Information of the Regional Watershed Alliance

TO: Chair and Members of the Regional Watershed Alliance
May 19, 2021 Meeting

FROM: Sameer Dhalla, Director, Development and Engineering Services

RE: **REGIONAL WATERSHED MONITORING PROGRAM (RWMP) UPDATE**

KEY ISSUE

Update regarding the Regional Watershed Monitoring Program and the environmental monitoring completed during 2020 as well as future planned deliverables.

RECOMMENDATION

WHEREAS the Toronto and Region Conservation Authority (TRCA), in partnership and collaboration with TRCA's municipal, science and academic partners, continues to conduct long-term environmental monitoring tracking the health of jurisdictional watersheds through the Regional Watershed Monitoring Network;

AND WHEREAS staff will continue with the implementation of monitoring activities associated with the ongoing Regional Watershed Monitoring Program, as well as to continue to pursue and foster partnerships under the Regional Watershed Monitoring Network;

IT IS RECOMMENDED THAT the staff report and presentation on the Regional Watershed Monitoring Network be received.

BACKGROUND

The Toronto and Region Conservation Authority's (TRCA) Regional Watershed Monitoring Program (RWMP) focuses on long-term monitoring of aquatic and terrestrial ecosystems at the sub-watershed and watershed scale and across the TRCA jurisdiction as a whole. The RWMP also directly supports TRCA's principal mandate "to reduce the risk to life and damage to property caused by flooding" by collecting hydrometrics data which directly supports TRCA's flood forecasting and warning role.

The RWMP was launched in 2001 as a mechanism to bring all of TRCA's ecological monitoring work under a single program. This program helped to provide better planning and coordination, protocol standardization, filling of data gaps, effective data management, and consistency and cost effectiveness. It also facilitates the communication of data availability and data sharing both internally and with external agencies. The program fulfilled and continues to meet the increasing data demand needed to evaluate ecosystem sustainability and gauge or report out on watershed ecosystem health, its current condition, and its response to factors such as land use change, and climate change.

The data collected represent an example of some of the best knowledge gathered with regards to sustainability. The data tells the story of TRCA's management of its aquatic and terrestrial ecosystems, as well as its use to mitigate flood risk and associated damage. The information collected through this program provides the underlying scientific data that informs key watershed planning and reporting mechanisms. It is used to support watershed-based planning, inform the land use change decision making process, gauge restoration opportunities, inform the review of various development permit requirements, and inform legislation or policy

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change initiatives. The data is shared with our regional municipalities, various consultants, research institutions, and other organizations at the federal and provincial levels.

The RWMP, with its established sets of protocols, also provides the ability to implement short-term or special project data collection/monitoring in a timely manner in response to needs identified by TRCA or its partners. The long-term annual data provides baseline data in support of “before and after” analysis related to ecosystem and infrastructure impacting events, such as development, and infrastructure maintenance works. The data also allows us to gauge the success of restoration initiatives, such as natural channel designs, erosion mitigation and bank stabilization work, and/or wetland restoration. More importantly, the long-term data set is used in our future project planning and designs to further improve TRCA’s management of our regional water resources for current and future generations. The RWMP data is also used to supplement development funded monitoring such as that associated with the Mayfield Phase 1 and Phase 2 lands, and Seaton development to help gauge the impacts of land use change and how it is being implemented from the planning approval stage, the construction phase, and post development.

Project partnerships with academic institutions facilitate achievement of common research objectives as well as data sharing in support of academic study. All elements of the program are designed to provide data sets that allow for interpretation at the site, watershed, and regional scales. Since the data is collected using standardized methodologies/protocols such as the Ontario Stream Assessment Protocol (OSAP) or the Ecological Land Classification method, the data can also be used to compare the trends found in the Toronto area to those found anywhere where data was collected following the same standardized methodologies. Thus, the data not only supports TRCA’s and its municipal partner’s common objectives but also facilitates knowledge gap bridging in other places across Ontario. The program provides the underlying scientific data that informs the key planning and reporting mechanisms of the TRCA.

Data collected to date illustrate the resiliency of our terrestrial and aquatic ecosystems as they continue to persist in what seems like an endless cycle of anthropogenic change. However, the data also shows the effects of urbanization on aquatic and terrestrial ecosystems, specifically showing a trend towards declining water quality, fish community composition/diversity, the quality and quantity of terrestrial habitat, and representation of species in areas of increasing urban land use. Where restoration and recovery plans are implemented, future monitoring will track the progress of such enhancement initiatives.

All program elements are strongly focused on the collection of scientific data, however, when possible, community outreach and education opportunities are incorporated. This is accomplished through partnerships with community groups and other non-governmental organizations, and through special events that demonstrate and educate or involve the community.

The following are monitored as part of the RWMP: aquatic and terrestrial habitats, benthic macroinvertebrate and fish communities and species; terrestrial flora and fauna communities and species; surface water and ground water quality and quantity; and West Nile virus mosquito vector monitoring.

The following table outlines the various environmental monitoring components included in the program and the agencies involved in the network. It also summarizes the monitoring that occurred during 2020 in accordance with the Covid-19 pandemic restrictions and rules:

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Monitoring Component	# of Sites 2020	Agency/Partner
Aquatic Habitat and Species		
Benthos	131	TRCA/MOECC
Fish /Habitat	42	TRCA/MNRF/DFO
Fluvial Geomorphology	11	TRCA
Stream Temperature	60	TRCA
West Nile Virus Monitoring	Resume 2021	TRCA/MOECC/Municipality
Water Quality		
Surface Water	47	TRCA/MOECC/City of Toronto
Groundwater	21	TRCA/MOECC
Water Quantity		
Stream Flow Gauges	34	TRCA/Env. Canada
Base Flow/Low Flow	172	TRCA
Water Level Gauges	49	TRCA
Precipitation	39	TRCA/Municipalities
Snow Course	10	TRCA/MNRF
Climate Stations	14	TRCA/MOECC
Terrestrial Natural Heritage		
Systematic Inventories	1800 ha	TRCA
Forest Bird Station	59	TRCA
Wetland Bird Station	27	TRCA
Meadow Bird Station	28	TRCA
Forest Vegetation Station	24	TRCA
Amphibian Station	26	TRCA
Wetland Vegetation Plot	23	TRCA

RATIONALE

The Regional Watershed Monitoring Program (RWMP) is an ongoing program developed by TRCA and its partners to provide a comprehensive, integrated and coordinated approach to environmental monitoring within TRCA's watersheds. This monitoring builds on the existing local and project-specific monitoring efforts of TRCA and their partners and is one of the key programs to assess, catalogue and report on the state, condition and trends in terrestrial and aquatic biodiversity throughout TRCA's jurisdiction. TRCA's comprehensive data collection and analysis capabilities increase standardization, reduce risk, and ensure predictable and a cost-effective operation supporting several initiatives including environmental restoration, scientific research, policy and regulatory support and watershed reporting. The Reporting Hub allows the user to view environmental data at various scales reporting for each indicator including targets, current conditions, and how conditions are changing over time, using the best available data and science.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

Strategy 2 – Manage our regional water resources for current and future generations

Strategy 6 – Tell the story of the Toronto region

Strategy 7 – Build partnerships and new business models

Strategy 8 – Gather and share the best sustainability knowledge

FINANCIAL DETAILS

Funding for the 2020/21 Regional Watershed Monitoring Program is made available from the following partners/sources: City of Toronto, Region of Peel, Region of York, Region of Durham, and the Toronto Remedial Action Plan (RAP) MOU 2020/21

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DETAILS OF WORK TO BE DONE

TRCA will continue to support our municipal and research partners by advancing science and continuing to implement the Regional Watershed Monitoring Network through the multiple project components as summarized below:

Aquatic:

Surface water quality data will be collected monthly at 47 stations spread across the TRCA jurisdiction.

- Groundwater level and water quality data will be collected from 21 sites spread throughout the TRCA jurisdiction. This data together with the surface water quality monitoring directly supports the Provincial Water Quality Monitoring network (PWQMN) partnership;
- Water temperature loggers will be installed at 38 locations;
- Benthic invertebrate sampling at 150 RWMP stations located across TRCA's 9 watersheds will occur beginning in June and finishing in September;
- Fish community and stream habitat will be re-surveyed during June-September at a total of 52 stations set-up in the Rouge River, Duffin's Creek, and Carruther's Creek watersheds;
- Monitoring of 35 RWMP fluvial geomorphology stations established in the Humber River will occur in the fall of 2021 in support of the Humber River watershed plan process;
- As part of RWMP's hydrometric's monitoring, which directly supports TRCA's flood forecasting and warning role; baseflow monitoring is planned to occur at a 172 stations, with water level gauges being installed at 49 gauges, stream flow gauges being installed at 34 stations, and 39 sites were precipitation gauges will be monitored during 2021;
- Also, under RWMP's hydrometrics umbrella 10 snow course sites, and 14 climate stations will be monitored throughout 2021.

Terrestrial:

- ~1500ha of natural cover to be surveyed for vegetation community, flora and fauna species data collected at
- Data to be collected at 114 bird monitoring stations (59 in forest habitat, 27 in wetlands and 28 in meadow) spread across the TRCA jurisdiction.
- Survey 26 frog monitoring stations
- Survey 24 forest vegetation plots
- Survey 23 wetland vegetation plots

Data Management:

RWMP data is stored internally on TRCA servers via multiple databases which aid in the quality control process and ensure the data is consistent in the way it is recorded per year. In addition, the 2020 fish community and aquatic habitat data was uploaded into Provincial Flowing Waters Information System (FWIS). Also, the 2013-2019 benthic community data has been uploaded to the OBBN open database portal. 2020 data will be made available by the end of May 2021.

Data correction and quality control has been undertaken on an ongoing basis since 2001.

Currently data is available for use across the stream, precipitation, and meteorological networks. Work on development of updated meta-data catalogue for RWMP datasets has been ongoing to facilitate enhanced data sharing with Regional Partners. Over the last several years TRCA has been working towards providing free and open access to our data and information, in both accessible and machine readable formats, to ensure it's available and easy to consume. Improving access to TRCA's data and information has provided transparency into the decision making process and accountability while increasing the public's understanding and engagement with the organization. Currently, data associated with water quality and fish community has been made available through our open data portal (<https://data.trca.ca/>).

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Annual updates to these datasets continue to occur and staff are working towards making other datasets such as water temperature data also available through our open data portal. Additional development of the web-based data will be undertaken following updates to our website.

The TRCA website within the environmental monitoring pages explains each aspect of the RWMP and associated reports which provide an analysis and interpretation summary based on the data. In 2020 two e-newsletters, summer, and fall, were produced that highlight key monitoring activities and products. Newsletters can be found at:
<https://trca.ca/conservation/environmental-monitoring/>

TRCA has also developed the Watershed and Ecosystems Reporting Hub, launched on Earth Day (April 22, 2021). The Reporting Hub is a modern version of The Living City Report Card that uses interactive displays that allow the user to view environmental data at various scales, including by region or local municipality.

The Reporting Hub explains the importance of different environmental indicators for understanding watershed and ecosystem health. Reporting for each indicator includes targets (where applicable), current conditions, and how conditions are changing over time, using the best available data and science.

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