

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Moranne McDonnell, Director, Restoration and Infrastructure

RE: **2020 EROSION RISK MANAGEMENT PROGRAM UPDATE**

KEY ISSUE

An information report regarding the Erosion Risk Management Program and related services and strategic updates from the Engineering Projects business unit of Restoration & Infrastructure.

RECOMMENDATION

WHEREAS TRCA staff were requested by the Executive Committee at meeting #3/19 to provide more information regarding the positive impact that the Federal Disaster Mitigation & Adaptation Fund will have on TRCA's plans for erosion mitigation work;

IT IS RECOMMENDED THAT this staff report on TRCA's Erosion Risk Management Program and the positive impacts of Federal Disaster Mitigation & Adaptation Fund and partner contributions be received;

AND FURTHER THAT this report be circulated to TRCA's municipal partners.

BACKGROUND

Managing the risk associated with the natural hazards of flooding and erosion is one of the primary roles of conservation authorities under the *Conservation Authorities Act*. Toronto and Region Conservation Authority (TRCA) fulfills this role through the delivery of multiple natural resource management programs and services, including the Erosion Risk Management Program (ERMP). The ERMP focuses on the identification and remediation of shoreline and valley land erosion hazards throughout TRCA's jurisdiction and encourages proactive prevention, protection, and management of erosion issues on private and public property.

While many business units in TRCA work to prevent and address erosion impacts, the main business unit that manages erosion hazards is Engineering Projects (EP) which is organized under the Restoration and Infrastructure Division (R&I). Under the ERMP, erosion hazards across TRCA's watersheds are identified and ranked on a priority basis. EP staff regularly conduct site visits throughout the year to assess and reprioritize erosion hazards in response to major weather events. As such, the list of priority sites is not static, and the ranking of sites may change within any given year as site conditions evolve or as new erosion hazard sites are identified. Stabilization works are conducted annually to address erosion hazards based on the available funding. In general, the ERMP is capially funded through TRCA's partners at the City of Toronto, Region of Peel, York Region, Durham Region, and on a project-by-project basis by the Ministry of Natural Resources and Forestry.

This report is also being brought forward following the announcement of TRCA's success in receiving \$22 million of additional funding over 10 years from Infrastructure Canada's Disaster Mitigation & Adaptation Fund (DMAF) for the Toronto Region Ravine Erosion Risk Management and Hazard Mitigation Project. While this funding will help accelerate critical erosion control

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work to protect private property and infrastructure throughout TRCA's jurisdiction, there is still a significant backlog of structures to be repaired or hazards to be addressed. Metrics highlighting this have been provided in the rationale below for the different portfolios under the ERMP.

RATIONALE

The following will provide a brief overview of the various portfolios and major programs operated under the ERMP.

Toronto Ravine Major Maintenance

The Toronto Ravine Major Maintenance portfolio is for repairing and maintaining TRCA's permanent erosion control assets across the City of Toronto. These structures are found along ravine and valley corridors or along natural slopes. Repairs are prioritized based on a number of factors such as: asset age; remaining service life; proximity of permanent buildings or essential infrastructure; consequence of failure; and current condition of the asset. In 2020, TRCA is planning 18 projects under the Toronto Ravine Major Maintenance portfolio and 16 of these projects will have 40% of the project costs funded by DMAF (approximately \$750,000).

Toronto Ravine Major Maintenance - Summary and Metrics		Comments
Estimated capital levy (2020-2029)	\$18,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	\$3,772,800	DMAF ends 2028
Total funding available (2020-2029)	\$21,772,800	
# of existing TRCA owned erosion control structures	300	
# of structures scheduled for maintenance - levy only	35	
# of structures scheduled for maintenance (2020-2029)	51	Without DMAF estimated number of structures repaired 2020-2029 = 35 (68% increase)
Total # of structures in backlog after 2029	203	Backlog = structures requiring repair prior <2029 but no funding allocated

Toronto Waterfront Major Maintenance

The Toronto Waterfront Major Maintenance portfolio is for repairing and maintaining TRCA's network of permanent shoreline erosion control assets along the City of Toronto waterfront. These structures are found along the north shore of Lake Ontario and are designed to protect the shoreline, adjacent tableland, public amenities, and infrastructure from erosion. Many of these assets are nearing the end of their lifespan and over the past three years catalogued damages to the structures have increased significantly due to multiple severe weather events. In 2020, TRCA is planning 7 projects under the Toronto Waterfront Major Maintenance portfolio, 5 of which will have 40% of the project costs funded by DMAF (approximately \$1 million).

Toronto Waterfront Major Maintenance - Summary and Metrics		Comments
Estimated capital levy (2020-2029)	\$51,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	\$33,794,667	DMAF ends 2028

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PF&R DMAF & High Lake Events contribution (2020-2025)	\$21,000,000	
Total funding available (2020-2029)	\$105,794,667	
# of existing TRCA owned erosion control structures	211	
# of structures scheduled for maintenance (2020-2029)	86	Without DMAF estimated number of structures repaired 2020-2029 = 47 (55% increase)
Total # of structures in backlog after 2029	86	Backlog = structures requiring repair prior <2029 but no funding allocated

Valley Erosion Hazards

The Valley Erosion Hazards portfolio addresses erosion hazards and slope instability issues impacting private and public property throughout the ravine systems of the City of Toronto. The July 8, 2013 severe weather event was the catalyst for a funding increase to this portfolio that prompted TRCA to extend assistance to private properties where homes have been deemed at risk by erosion or instability. The goal of each project is to provide a cost-effective solution to protect essential infrastructure, such as residential dwellings and municipal assets, and projects are implemented on a priority basis to the limit of available funding each year. Landowners must comply with TRCA's Private Landowner Contribution Policy for Erosion Control Works Policy that requires benefiting landowners to convey land or contribute a portion of the project costs. In 2020, TRCA is planning 27 projects under the Valley Erosion Hazard portfolio and 20 of these projects will have 40% of the project costs funded by DMAF (approximately \$840,000).

Toronto Valley Erosion Hazards - Summary and Metrics		Comments
Estimated capital levy (2020-2029)	\$32,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	\$7,150,000	DMAF ends 2028
Total funding available (2020-2029)	\$39,150,000	*excludes benefiting landowner contributions
# of hazard sites being monitored	650	
# of sites to be addressed (2020-2029)	170	Without DMAF estimated number of sites to be repaired 2020-2029 = 100 (59% increase)
Total # of high priority sites in backlog > 2029	232	

York Region Infrastructure

The York Region Infrastructure portfolio provides long-term erosion hazard management for Environmental Services infrastructure assets along ravines and watercourses (water and wastewater). The portfolio includes the monitoring, study, design, maintenance and implementation of erosion control works for infrastructure protection in TRCA's jurisdiction of York Region. Studies and remedial works are prioritized based on a number of factors such as: depth of cover; infrastructure type; remaining service life; consequence of failure; and current condition of the asset. In 2020, TRCA is planning 14 projects under the York Infrastructure portfolio and 9 of these projects will have 40% of the project costs funded by DMAF (approximately \$176,000).

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York Region Infrastructure - Summary and Metrics		Comments
Estimated capital levy (2020-2029)	\$9,330,000	
DMAF contribution (2020-2028)	\$1,600,920	DMAF ends 2028
Total funding available (2020-2029)	\$10,930,920	
# of infrastructure hazard sites being monitored	533	
# of sites to be addressed (2020-2029)	20	Without DMAF estimated number of sites to be repaired 2020-2029 = 10 (100% increase)
Total # of high priority sites in backlog > 2029	23	

York Region Maintenance & Other Hazards (TRCA priorities)

The York Region Maintenance & Other Hazards portfolio is for maintaining TRCA's existing permanent erosion control assets and developing new erosion control protection on TRCA lands within York Region. These assets are often found along ravine and valley corridors or along natural slopes. Repairs are prioritized based on a number of factors such as: asset age; remaining service life; proximity of permanent buildings or essential infrastructure; consequence of failure; and current condition of the asset.

In 2020, TRCA is planning 8 projects under the York Region Maintenance & other hazards (TRCA priorities) portfolio and 4 of these projects will have 40% of the project costs funded by DMAF (approximately \$34,000).

York Region Maintenance & Other Hazards - Summary and Metrics		Comments
Estimated capital levy and private landowner contribution (2020-2029)	\$1,500,300	
DMAF contribution (2020-2028)	\$193,220	DMAF ends 2028
Total funding available (2020-2029)	\$1,693,520	
# of erosion control structures and erosion hazard sites being monitored	164	122 erosion control structures and 42 erosion hazard sites
# of sites to be addressed (2020-2029)	6	Without DMAF estimated number of sites to be repaired 2020-2029 = 3 (100% increase)
Total # of high priority sites in backlog > 2029	9	

Region of Peel Erosion Control & Infrastructure Protection

The Region of Peel Erosion Control and Infrastructure Protection portfolio monitors the risk to TRCA owned erosion control structures, Region of Peel infrastructure hazard monitoring sites, and other erosion hazards impacting public and private land. This portfolio includes the monitoring, study, design, maintenance and implementation of erosion control works to remedy these hazards. Mitigation measures and repairs are prioritized based on several factors such as: depth of cover; remaining service life; infrastructure type; consequence of failure; and current condition or exposure of the asset. Prioritization is based on the highest risk locations which in recent years tends to be infrastructure sites.

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Beginning in 2017, TRCA delineated 1,376 infrastructure hazard sites within the Region of Peel in TRCA's jurisdiction to establish long-term monitoring sites with first inspections at most sites being completed between 2017-2019. In addition to these infrastructure sites, TRCA currently monitors a total of 135 erosion control structures and 50 erosion hazard sites. In 2020, TRCA is planning 4 projects under the Region of Peel Erosion Control and Infrastructure Protection portfolio and all 4 of these projects will have 40% of the project costs funded by DMAF (approximately \$200,000).

Region of Peel Erosion Control & Infrastructure Protection – Summary & Metrics		Comments
Estimated capital levy (2020-2029)	\$7,000,000	
DMAF contribution (2020-2028)	\$1,512,000	DMAF ends 2028
Total funding available (2020-2029)	\$8,512,000	
# of existing TRCA owned erosion control structures and infrastructure hazard monitoring sites	1,511	135 TRCA owned erosion control structures and 1,376 infrastructure hazard monitoring sites
# of sites to be addressed (2020-2029)	18	Without DMAF estimated number of sites to be addressed in 2020-2029 = 10 (80% increase).
# of critical/high priority sites in backlog >2029	80	

Fee for Service Work

EP also undertakes projects for TRCA's regional and municipal partners on a fee for service (FFS) basis to help address their priorities. These FFS projects vary in scale and complexity, but typically involve mitigating erosion hazard risks to public safety or municipal infrastructure as part of the design solution in natural or environmentally-sensitive areas.

In the City of Toronto, TRCA partners with the Parks, Forestry & Recreation (PF&R) and Transportation Services divisions through a Master Service Agreement. TRCA expects to establish similar master service level agreements with other municipalities and regions to help establish a streamlined scoping/funding process to help deliver additional recoverable projects while strengthening TRCA's partnerships and financial resilience.

In 2020, EP expects to undertake planning/implementation activities on 34 FFS projects with various municipal/regional partners.

ERMP – Other strategic updates

EP staff have been working on some key updates to the ERMP to improve operational efficiency. We have highlighted these initiatives in addition to some of the high-profile and emergency works projects EP staff are working on in the following sections.

Property Services & Legal – ECA updates and program changes

In 2019, EP and Property and Risk Management (PRM) staff embarked on significant updates

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to existing agreement templates and operating procedures to ensure contributions under TRCA's Private Landowner Contribution for Erosion Control Works Policy were received prior to commencing work. This will reduce liability to TRCA by ensuring that financial contributions to projects are received and that land transfers take place in a timely manner and can be registered on title.

EP staff, with support from PRM, will be developing a standard operating procedure for this process later in 2020 to ensure that the necessary steps required to execute these agreements are followed in the correct order and in a timely manner.

Toronto Water Monitoring

In 2010, the City of Toronto and TRCA developed a long-term monitoring partnership to assess the risks to Toronto Water infrastructure in ravine and valley systems. The objective of the program is to inspect Toronto Water infrastructure within the City of Toronto's stream valleys and along the shoreline of Lake Ontario for the purpose of identifying Toronto Water infrastructure that is at risk or has been damaged due to erosion before a complete failure occurs. The program reduces environmental and public health and safety risks and allows Toronto Water staff to effectively and efficiently plan, prioritize and budget for asset maintenance, improvement, replacement and protection.

In 2020, TRCA staff anticipate that approximately 2,500 assets will be inspected due to the program growth requested by Toronto Water (doubling of field staff). TRCA staff inspected a total of 1,121 assets in 2019.

Post-storm monitoring / Incident Management System (IMS) - Erosion Risk Management

2019 was the first operational year of the IMS for Erosion Risk Management that was developed to follow a similar methodology as the TRCA Flood Risk IMS. The EP team decided to follow this model to coordinate response efforts in preparation for the potential of another significant erosion event like the July 8, 2013 storm. Utilizing the IMS in 2019, EP staff monitored 14 storm events, 4 high-wave warnings, and 4 months of high lake levels. Field crews were deployed to priority areas and findings were shared with municipal partners, impacted stakeholders, and other TRCA departments. TRCA has developed a Flood Risk Analysis Network tool named FRANK-to schedule 45 site inspections at TRCA owned erosion control structures within the impacted ravine systems. In previous years, EP staff would attempt to inspect every TRCA owned structure regardless of whether it had been impacted by a significant weather event. This change in approach for 2019 resulted in 640 less inspections at a cost savings of approximately \$28,000. These savings were leveraged to establish testing sites for Remotely Piloted Aircraft (RPA) inspections, a technology that will be increasingly utilized in the future.

A jurisdiction-wide storm event on January 11th, 2020, which activated the EP's IMS system prompting staff to coordinate inspections and respond to erosion reports from the Flood Risk Management (FRM) group's Emergency Operations Centre (EOC). Field crews were deployed immediately and had inspected 54 sites across the jurisdiction from Etobicoke to the Rouge watersheds and north of Kleinburg to the Scarborough Bluffs shoreline in the first week. EP staff provided inspections summaries to other TRCA staff to ensure the Flood Duty Officers and relevant staff were informed of preliminary findings and next steps.

Yellow Creek (Vale of Avoca)

Due to risks to public health and safety, as well as essential infrastructure, TRCA declared emergency works for a 90-metre section of Yellow Creek below Summerhill Gardens in the Vale of Avoca ravine on July 31, 2019. The goal of this project is to remove the exposed stone and

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mortar retaining wall and to realign the channel away from the slope. This work will help reduce the risk of future slope failures in this area. In addition, TRCA is building erosion control structures within the creek and is restoring a section of trail along the west bank that was lost due to erosion. Construction was initiated on August 29, 2019 and is anticipated to be completed in Spring of 2020. Photos captured during construction can be found in **Attachment 3**.

High Lake Events and Toronto Islands

The 2017 high lake level event resulted in flooding and erosion damage along the length of the City of Toronto shoreline from Marie Curtis Park in the west to Rouge Beach Park in the east. TRCA and City of Toronto staff collaborated to mitigate, document, catalogue, inspect and assess this damage. With the lake still above average spring levels, the City of Toronto was impacted by the ice and windstorm of April 14-15, 2018 which further exacerbated the shoreline damage. City of Toronto and TRCA staff coordinated efforts to assess the damage. High lake levels in 2019 contributed to further flooding, erosion, and damage to the Toronto shoreline resulting in a total of over \$30 million in estimated damages to City and TRCA property and assets since 2017.

Since these major events, TRCA and City of Toronto staff have been implementing emergency needs works and prioritizing and planning all other identified immediate and short-term needs projects across the entire waterfront. While the impacts of the high lake level events have been felt along the entire length of Toronto's waterfront, the floods in both 2017 and 2019 disproportionately affected Toronto Island Park where over 800 residents, many businesses, and two schools were directly affected.

In anticipation of 2020 flooding, TRCA has initiated the Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA) process by issuing an emergency declaration to the Ministry of Environment, Conservation and Parks and Conservation Ontario. TRCA with the support of the City is raising park roads and implementing flood mitigation structures at key points on the Island in order to maintain emergency service access across the Island, protect park infrastructure, preserve the user experience, and reduce potential Island revenue loss. Additional information can be found in the declaration which is viewable as **Attachment 4**.

Following emergency work implementation, TRCA has committed to helping the City of Toronto continue the Class EA process and determine a long-term mitigation solution for the remainder of the Island. This work will be integrated with the Toronto Island Park Master Plan initiative and may involve elevating additional low-lying roads, implementing shoreline berms, raising the elevation of existing shoreline structures and/or directing water to pumping systems.

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

This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 7 – Build New Partnerships and Business Models

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Attachment 1: Table of projects being planned under the ERMP in 2020

Attachment 2: Map of projects being planned under the ERMP in 2020

Attachment 3: Photographs of various projects being planned under the ERMP in 2020

Attachment 4: Toronto Island Park Flood and Erosion Mitigation Project – Emergency Works
Declaration