Item 7.2

Section I – Items for Board of Directors Action

TO:	Chair and Members of the Board of Directors Friday, October 28, 2022 Meeting
FROM:	Sameer Dhalla, Director, Development and Engineering Services
RE:	**TRCA'S UPDATED NATURAL HERITAGE SYSTEM (NHS) AND WATER RESOURCE SYSTEM (WRS) MAPPING**

KEY ISSUE

Board approval of Toronto and Region Conservation Authority's (TRCA) updated regional target Natural Heritage System (NHS) and Water Resource System (WRS) mapping. These products inform TRCA and its municipal partners in land use planning, ecosystem restoration and management, land securement, and other conservation efforts in the watersheds of the Toronto region.

RECOMMENDATION:

WHEREAS urbanization and climate change continue to impact ecosystem health and community well-being, unless mitigated;

AND WHEREAS provincial policies direct municipalities to protect and enhance key natural heritage and hydrological features and areas as part of the land use planning process;

AND WHEREAS TRCA, as a science-based organization, generates and shares up-to-date information on natural heritage and water resources to support TRCA's initiatives and those of its partner municipalities;

AND WHEREAS TRCA has developed two science-based proactive screening tools: first, the updated regional target Natural Heritage System (NHS) mapping, and second, Water Resources System (WRS) mapping. These products provide an update to the mapping component of the Terrestrial Natural Heritage System Strategy (TNHSS) approved by the TRCA Board in 2007;

AND WHEREAS TRCA's approach for developing the updated regional target NHS and WRS mapping aligns with the ecological principles of the TNHSS, and the Natural Systems planning principles of The Living City Policies for Planning and Development in the Watersheds of the TRCA as approved by the Board of Directors in 2014;

AND WHEREAS TRCA engaged regional and local municipalities, neighbouring conservation authorities, provincial ministries, agricultural communities, the Building Industry and Land Development Association (BILD), and Indigenous communities in the development of the mapping and incorporated feedback into the screening tools;

AND WHEREAS the draft updated mapping has already been informing the initiatives of TRCA and its partner municipalities, including Municipal Comprehensive Reviews and local municipal Official Plan Reviews, watershed planning, ecosystem restoration and management, land securement and management, climate adaptation initiatives, and land use and infrastructure planning processes;

THEREFORE, LET IT BE RESOLVED THAT the Board of Directors approve TRCA's updated regional target NHS and WRS mapping and that these products be used as screening tools to support and inform municipal natural heritage and water resource systems planning, implementation of The Living City Policies for Planning and Development in the Watersheds of the TRCA, and TRCA programs and services related to the management of conservation authority lands;

AND THAT TRCA staff communicate the final approval of the TRCA's updated regional target NHS and WRS mapping to all its partners and stakeholders engaged in the consultation process related to its updating and development.

BACKGROUND

Urbanization is the process of converting natural cover (e.g., woodland, wetland, meadow) or agricultural land to urban land uses usually dominated by impermeable surfaces (e.g., buildings, roads, parking lots). Within TRCA's jurisdiction, just over half of the land base has been converted to urban land uses. Left unmitigated, urbanization has a negative impact on ecosystem functions and services that are vital for watershed health and community well-being. These impacts are further exacerbated by climate change and associated extreme events unless measures are put in place to build resilience.

Provincial policies recognize these challenges and require that municipal growth management strategies and policies protect, restore, and enhance natural systems. The Provincial Policy Statement (PPS, 2020) and provincial plans support natural systems planning by requiring municipalities to identify and protect NHS and WRS in their Official Plans (OP).

TRCA's partner municipalities often rely on TRCA to provide up-to-date data and science-based information that they can use to achieve policy conformity and shared objectives for environmental resilience and sustainable communities. In this regard, TRCA has developed updated NHS and WRS mapping to assist our partner municipalities in growth management exercises including infrastructure planning and other conservation efforts as they see fit.

The analysis used to produce this mapping is based on well accepted scientific foundations with a view to informing natural heritage and water resource systems planning and management over the long term. Given the long-term planning horizon in OPs, the growth and development pressures in TRCA's watersheds, and the ongoing effects of urbanization and climate change, a science based, long term view is critical to sustainability and resilience.

The objective of the NHS and WRS mapping is to provide updated science-based information that aligns with the ecological principles of TRCA's Terrestrial Natural Heritage System Strategy, approved by the Board of Directors in 2007 (Resolution #A306/06) and the natural systems planning principles of TRCA's Living City Policies (2014). The mapping is intended to inform ecosystem planning and management activities for TRCA and its partner municipalities, including watershed planning, land use and infrastructure plan reviews, ecosystem restoration and management, and Municipal Comprehensive Reviews (MCRs) and lower tier municipal OP conformity.

The mapping can be used as a screening tool and is meant to identify opportunities and facilitate partnerships for healthy and resilient natural systems within the Toronto region. Given that these tools were developed at a regional scale based on the best available data and

information of the time, they will require refinements based on finer level data, as appropriate, for application at a site scale.

As screening tools, this mapping is not intended to replace the need for additional investigation and field data collection part of current planning processes. Accordingly, these tools are not intended to disrupt or prohibit existing permitted uses (e.g., agriculture) or change current decision-making regarding site-specific planning and infrastructure approvals.

The following two sub-sections provide more detail on the approach used to develop TRCA's updated regional target NHS and WRS mapping screening tools.

TRCA's updated Natural Heritage System (NHS)

In the early 2000s, TRCA developed a regional Terrestrial Natural Heritage System Strategy (TNHSS) applying an ecosystems approach to establish a network of natural cover (forest, wetland, meadow, successional, bluffs and beach) within the Toronto region targeted for protection and restoration. The primary intent was to address the declines in native biodiversity by focusing on terrestrial natural cover. After an extensive consultation process, the TRCA Board approved the TNHSS in 2007.

The TNHSS was used by several municipalities for informing their own natural heritage systems planning and helped inform various ecosystem protection, restoration, and management efforts by TRCA and partner municipalities. Integrated into TRCA's The Living City Policies, the TNHSS reflects the fundamental principles of ecology and conservation science that a diverse, robust, and well-connected natural heritage system is the foundation of a sustainable and resilient community.

Since 2007, landscape changes due to our jurisdiction's continued growth and intensification and the impacts of climate change demonstrate the need for updates the mapping of the TNHSS. The current update for NHS mapping, embodies the principles of the TNHSS and builds on them, with analysis that spans both terrestrial and aquatic ecology including natural heritage features and areas.

Using a science-based integrated systems approach, the mapping identifies existing natural heritage features and areas and priority areas with potential for restoration and enhancement of ecological functions. These restoration areas provide cohesiveness and connectivity necessary for maintaining robust, resilient natural systems. This approach includes both terrestrial and aquatic ecosystem priorities as well as the linkages between them (i.e., hydrological linkages) and accounts for the contribution of entire watersheds - from urban to rural areas - to achieve natural heritage functions.

TRCA's updated regional target NHS promotes TRCA's ecosystem health that supports natural systems and the ecosystem services they provide in a region heavily impacted by land use and climate change. It aligns with the PPS (2020) that require municipalities to identify natural features and areas and protect them for the long term (PPS 2020; 2.1.1) and emphasizes that "*the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage system, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features*" (PPS 2020; 2.1.2).

Technical approach:
To produce the mapping, multiple data sets were used as input criteria in an optimization model called MARXAN. The data sets were both existing and new and characterized ecosystem features and functions. MARXAN helped staff to identify the most strategic areas that maximizes inclusion of highest priority areas for all input criteria. The input criteria included existing natural features and areas such as woodlands, wetlands, and Areas of Natural and Scientific Interest.

New analyses were completed to identify priority areas for aquatic and terrestrial species habitat. These include priority upland areas important for sensitive in-stream habitat, important hydrological linkage areas, areas with high suitability for various species and vegetation communities, wildlife connectivity/movement priority areas, and areas with high biodiversity. A consolidated municipal NHS map that included all NHS mapping in the municipal official plans in TRCA's jurisdiction (as of 2018) was also used as one of the input criteria.

Detailed methods and the full list of criteria are summarized in the NHS Update Summary Report included here (Attachment 1) and highlighted in the online dashboard (Link here).

Applying this approach, TRCA's updated regional target NHS (Figure 1) identifies about 35% of the TRCA's jurisdiction as NHS comprising *Existing Natural Cover* (ENC) (23.3%) and *Potential Natural Cover* (PNC) (11.9%) that can be prioritized for protection and restoration, respectively; *Contributing Areas (16.5%)* were also identified as part of the target system as areas meant to support NHS features and functions.

Contributing Area include areas that are ecologically important but mostly within urban land uses where traditional restoration opportunities may be limited due to existing conditions (e.g., built areas) and/or planned objectives (e.g., approved for future development). Contributing Areas are intended for sustainable and resilient urban design solutions, where Low Impact Development and Green Infrastructure (GI) can be implemented.

Strategically targeting ENC, PNC, and Contributing Areas prioritizing both natural and built portions of TRCA's watersheds for protection, restoration, and GI enhancements, will result in a healthy and resilient NHS that sustains ecosystem functions and services over the long term.

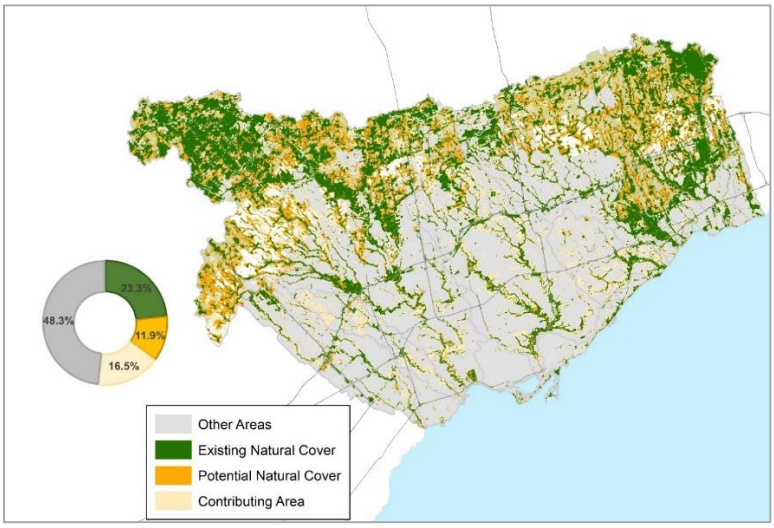

Figure 1: TRCA's updated regional Target Natural Heritage System (NHS).

TRCA Water Resource System (WRS)

The Water Resource System (WRS) is defined and described in provincial policies and plans. Specifically, the Growth Plan for the Greater Golden Horseshoe (2020) highlights that the Water Resource System (WRS) includes Key Hydrological Features and Key Hydrological Areas that are important for hydrological functions over long term which are needed to sustain ecosystems and our communities.

Additionally, the Greenbelt Plan highlights that both the NHS and WRS are vital components of natural systems and should be managed as an integrated system. Protecting the WRS is imperative for protecting water quality and quantity, aquatic and terrestrial ecosystem health, and for mitigating erosion and flooding.

There are eight key components of the WRS that were delineated using definitions provided in the Growth Plan (2020). The WRS is the output of compiled and consolidated information from various data sources across TRCA's watersheds, including both field and modelled data. The components include:

Key Hydrologic Features

- Permanent and Intermittent streams
- Inland lakes and their littoral zones
- Seepage areas and springs
- Wetlands

Key Hydrologic Areas

- Significant Groundwater Recharge Areas (SGRAs)
- Highly Vulnerable Aquifers (HVAs)
- Significant Surface Water Contribution Areas (SSWCAs),
- Ecologically Significant Groundwater Recharge Areas (ESGRAs).

Of these eight components, two KHAs - Highly Vulnerable Aquifers (HVAs) and Significant Groundwater Recharge Areas (SGRAs) - were developed to satisfy requirements of the Source Protection Plan for Credit Valley, Toronto and Region and Central Lake Ontario region (CTC-SPC 2015) under the Clean Water Act (2006). Thus, there is already a process in place for HVAs and SGRAs, which is detailed in other referenced materials. These layers were used as-is for the WRS mapping. The other two KHA data layers - ESGRAs and Seepage areas and Springs - were generated by TRCA with guidance from the Province and partner CAs to ensure complete mapping of WRS across TRCA watersheds. The remaining data layers were updated and refined based on available data.

Detailed methods are summarized in the WRS Summary Report included here (Attachment 2) and highlighted in TRCA's Watershed and Ecosystem Reporting Hub (Link here).

TRCA's WRS mapping (Figure 2) includes 64.8% of TRCA jurisdiction. This includes HVAs (43.3%), SGRAs (29.1%), ESGRAs (13.9%), seepage areas and springs (10.4%), SSWCAs (9.3%), wetlands (4.4%), and inland lakes and their littoral zones (0.4%). Classification of watercourses found that permanent (46.6%) and intermittent (21.1%) streams make up most of the watercourses, however, there remains a large portion of unknown watercourses (i.e., data deficient; 32.2%).

The highest area coverage in the WRS is due to two KHAs - HVAs and SGRAs. As discussed above, these are also protected through Source Water Protection policies and have separate processes for implementation.

Other KHAs (ESGRA and SSWCA) and KHFs (seepage areas and springs) also cover substantial portions of TRCA's jurisdiction and may extend outside the natural areas into the built environment. While this doesn't preclude policy requirements for avoidance, where possible, key hydrological features and functions should be maintained through mitigation measures (i.e., water balance). The WRS mapping provides a broader system picture of ecohydrological processes occurring on the landscape that can better inform the finer levels of the planning at the site scale where further field level data can inform management actions to protect and enhance the WRS.

As outlined in the earlier section, the WRS mapping is based on a systematic and science-based method and provides a robust screening tool for TRCA and its municipal partners to identify important hydrological features and areas for their various initiatives.

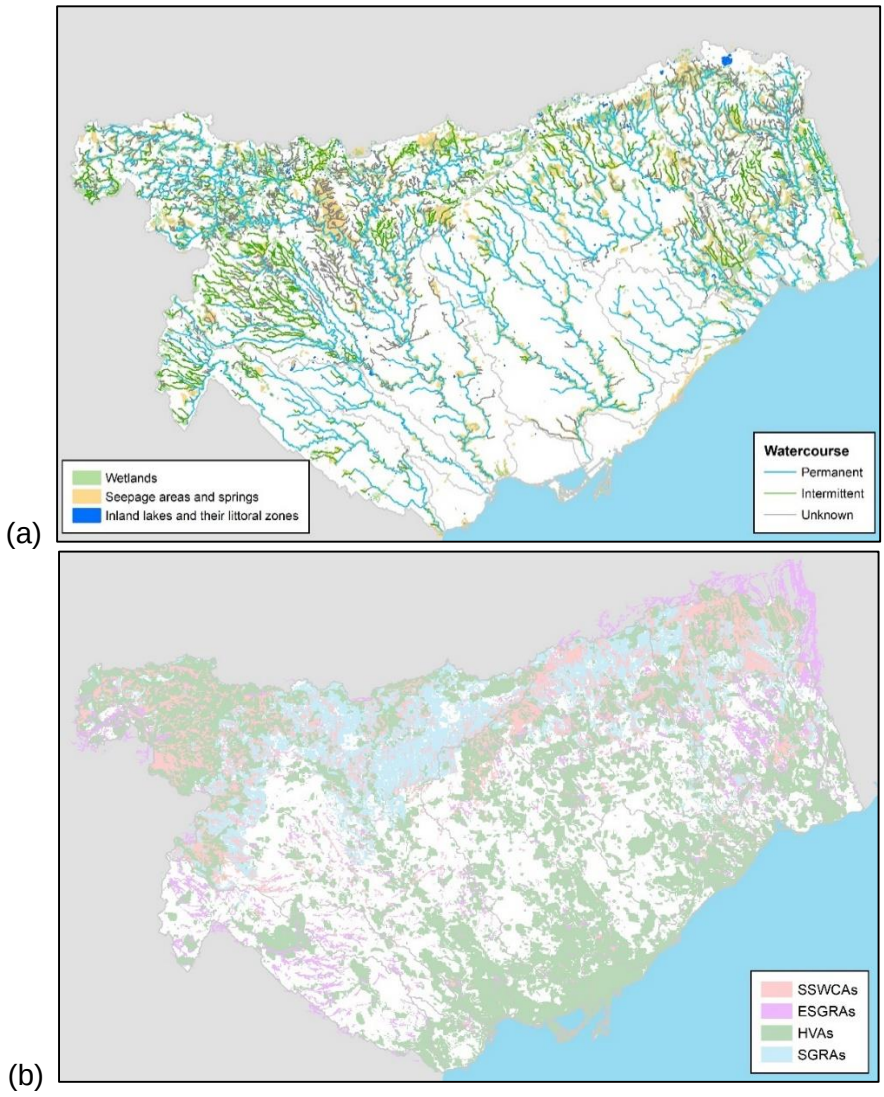

Figure 2: TRCA's Water Resource System Mapping (a) Key Hydrologic Features, and (b) Key Hydrologic Areas.

Engagement Approach and Feedback
TRCA staff engaged with municipal staff on a regular basis throughout the development of TRCA's updated regional target NHS and WRS mapping. Specifically, this has mostly occurred with initiatives related to watershed planning and MCR processes. In addition, upon completion of the draft mapping, TRCA staff hosted a technical webinar (virtual) on October 2021 where draft mapping and information was shared with the representatives from local and regional municipalities, the Province (MECP, NDMNRF, MMAH), and other conservation authorities (CVC, LSRCA, CLOCA, CH, NVCA). A total of 65 participants attended the webinar and provided feedback at and after the webinar during the commenting period.

TRCA staff also hosted a virtual meeting with First Nations in October 2021 to share information on TRCA's updated regional target NHS and WRS mapping and receive feedback. This meeting was attended by 10 representatives from Beausoleil First Nation, Curve Lake First Nation, Mississaugas of the Credit First Nation, and Six Nations of the Grand River.

Lastly, TRCA staff presented TRCA's updated regional target NHS and WRS mapping information to representatives of the Building Industry and Land Development (BILD), Peel Agricultural Advisory Working Group, Durham Agricultural Advisory Committee, and York Region Agricultural and Agri-Food Advisory Committee meetings in February and March 2022.

TRCA's updated regional target NHS and WRS mapping information and draft data layers were shared at these engagement sessions, which yielded more than a hundred comments. Overall, the external comments were generally supportive of the intent, structure, and content of the draft mapping. It should be noted that some participants had seen the draft mapping previously through discussions with TRCA Watershed Planning and Ecosystem Science staff for MCR, Settlement Area Boundary expansion, and watershed planning discussions.

Overall, the feedback indicates that the draft mapping is helpful as a high-level screening tool to inform natural heritage and water resource system protection, restoration, and enhancement initiatives. More specifically, many comments focused on site-level data accuracy and suggestions for revisions, which have been completed by TRCA staff. There were some comments seeking clarification on the intent of these tools and how they are meant to be implemented. In response, this was clarified in the updated report and the mapping disclaimers. The comments sheet (Attachment 3) documents all comments received and how TRCA staff addressed them through revisions and/or provided response to, as appropriate.

Furthermore, the draft versions of the TRCA's updated regional target NHS and WRS mapping have already been used by TRCA staff and municipal staff to inform the NHS and WRS mapping and policy directions in the updated Regional Official Plans, many of which have been adopted by Regional Councils (and are pending final approval from the Province).

Additionally, some municipalities such as The City of Toronto have incorporated components of the NHS (e.g. subset of the Contributing Areas) and WRS (e.g. wetlands, ESGRAs) mapping directly into their OP schedules. These draft screening tools have also been used to inform various TRCA initiatives including watershed planning (Etobicoke Creek Watershed Plan), land use and infrastructure plan reviews, and ecosystem restoration, with appropriate refinements.

RATIONALE
With the conclusion of the technical analysis, review, and engagement with partner municipalities, the Province, agricultural communities, BILD, and Indigenous communities, TRCA's regional target NHS and WRS mapping has now been finalized. All the comments

received from the engagement have been incorporated and appropriate revisions have been made. The final draft of the screening tool and the data layers have informed the MCR processes, as intended.

This multi-year initiative to develop a strategic, defensible, and operational science-based screening tool provides a robust basis for informing the protection and enhancement of the natural heritage and water resource systems of the region within TRCA's jurisdiction. These tools can inform various initiatives of TRCA, and its municipal partners as outlined earlier and will be accessible for viewing through TRCA's Watershed and Ecosystems Reporting Hub. These regional tools will be kept up to date at a regional scale through regular updates on a three-to-five-year cycle to align with other strategic initiatives. At finer scales they will be refined through watershed planning processes (e.g., Etobicoke Creek Watershed Plan and Humber River Watershed Plan) as well as through land use and infrastructure planning processes that can provide additional site level data.

We recommend that the TRCA Board of Directors approve the TRCA's regional target NHS and WRS mapping to support biodiversity and ensure that ecosystem features and functions within the Toronto region remain resilient to the pressures of urbanization and a changing climate. The mapping is intended to be used as a regional scale screening tool that should be refined, as appropriate, if it is to be applied at the site scale. A more comprehensive discussion of biodiversity initiatives that TRCA is currently involved in will be provided in a future Board report.

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 3 – Rethink greenspace to maximize its value
Strategy 4 – Create complete communities that integrate nature and the built environment
Strategy 12 – Facilitate a region-wide approach to sustainability

FINANCIAL DETAILS
The development of the TRCA's updated regional NHS and WRS mapping and engagement was supported by capital funding from the regional municipalities of York, Peel, and Durham and the City of Toronto (capital levy accounts 104-23, 120-62, and 120-02). Additionally, TRCA staff secured external funding in the form of grants from Mitacs Inc. and Great Lakes Sustainability Fund to complete parts of the project.

DETAILS OF WORK TO BE DONE
As updates to existing TRCA documents, policies, plans and processes occur or as new documents are produced, TRCA's updated regional NHS and WRS mapping will be referenced. The updated NHS and WRS mapping also helps staff achieve Living City Policies and associated guidelines, watershed planning, land use and infrastructure plan review processes, ecosystem restoration and management, and land acquisition and management activities.

TRCA's updated regional NHS and WRS mapping will be posted on TRCA's website and will be reviewed every three to five years to reflect new science and any major updates on the ground confirmed through site and area specific processes, fieldwork, and scientific studies. TRCA will communicate the approval of TRCA's updated regional NHS and WRS mapping to our provincial, municipal and conservation authority partners as well as other partners and stakeholders including those consulted in the development and updating of the NHS and WRS mapping.

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Report prepared by: Namrata Shrestha
Email: namrata.shrestha@trca.ca
For Information contact: Namrata Shrestha, (437) 772-3025; Jonathan Ruppert, **(437) 880-2361s**
Emails: namrata.shrestha@trca.ca; **jonathan.ruppert@trca.ca**
Date: August 29, 2022
Attachments: 2

Attachment 1: NHS Update Summary Report 2022
Attachment 2: WRS Summary Report 2022