Attachment 2 – TRCA Response to COA Review

Toronto and Region Conservation Authority

August 27, 2019

BY E-MAIL ONLY (glo@ontario.ca)

Carolyn O'Neill
Great Lakes Office
Ministry of the Environment, Conservation and Parks
40 St Clair Avenue West, Floor 10
Toronto, ON
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Dear Ms. O'Neill:

Re: Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (ERO #019-0198)

Thank you for the opportunity to comment on the Ministry of Environment, Conservation and Parks' Environmental Registry posting on the proposed new Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (COA).

Toronto and Region Conservation Authority (TRCA) undertakes a number of roles affecting the health of the Great Lakes within its watershed-based jurisdiction: as a public commenting body under the *Planning Act* and *Environmental Assessment Act*, as a regulator of development under the *Conservation Authorities Act*, a proponent of restoration, remediation and recreational use projects on TRCA-owned or managed lands, and as a resource management agency and service provider to member municipalities and other public agencies. These roles are in addition to environmental education, stewardship and outreach services. TRCA and its partners strive to help communities understand, look after and enjoy the natural environment and to increase residents' and businesses' awareness of flood and erosion hazards that can threaten people, property and infrastructure.

Purpose of the Update
We understand the Canadian and Ontario governments recognize the need to strengthen efforts to address new and continuing threats to Great Lakes water quality and ecosystem health, including aquatic invasive species, excessive nutrients, harmful pollutants, discharges from vessels, climate change and the loss of habitats and species.

Ecosystem Approach
TRCA supports the proposed update to the COA and appreciates that it is premised on the belief that Great Lakes water quality and ecosystem health cannot be achieved by addressing individual threats in isolation, but rather depends upon the application of an ecosystem approach that addresses individually and cumulatively all sources of stress to the Great Lakes (page 3 of the draft COA). There is a strong alignment with conservation authorities' ecosystem approach and watershed-based work that serves to mitigate for the impacts of urbanization and climate change on the Great Lakes and improves ecosystem health. On a collective basis, conservation authorities and their partners' environmental protection and management of rivers, wetlands and headwaters provide downstream benefits to the Great Lakes, including those for water quality, habitat and recreation.

Participation by Conservation Authorities
In the Province's Great Lakes Strategy and the *Great Lakes Protection Act*, conservation authorities (CAs) are named as essential partners in the implementation of programs and project initiatives to protect and improve the health of the Great Lakes. With CAs as partners, the Province has initiated outreach and guidance on integrated stormwater practices, environmental farm plans, habitat restoration and environmental monitoring. TRCA works in concert with federal, provincial and municipal governments on aquatic and terrestrial shoreline restoration projects, as do many of the CAs on the Great Lakes. Therefore, as local watershed and partnership agencies, CAs are well-positioned to play a key role in many of the actions identified in the COA. This is particularly the case for the Greater Golden Horseshoe CAs with Great Lakes shorelines and In-take Protection Zones, such as TRCA's jurisdiction, where the impacts of urbanization and the compounding effects of climate change are acutely felt.

TRCA and the COA
The draft COA contains many initiatives that align with TRCA's Strategic Plan, business units and current program delivery. The Toronto and Region Remedial Action Plan (RAP) is the largest program currently supported by COA. TRCA administers the RAP for the Toronto Area of Concern (AOC) as part of a 5-year (2015-2020), $2.5 million agreement with Environment and Climate Change Canada and the Ministry of Environment, Conservation and Parks (matching funding). In addition to habitat restoration work, through development and infrastructure planning processes, TRCA staff work with municipalities and proponents to ensure restoration is directed toward strategic areas to address RAP priorities in the Toronto AOC.

Close working relationships with provincial staff have also been key to past COA partnerships. For your reference, we have attached a listing of TRCA programs, partnerships and interests that contribute to achieving the goals of the COA (Appendix 1). While the list may not be exhaustive, it makes evident TRCA programs' significant contribution to meeting federal and provincial objectives for Great Lakes water quality and ecosystem health.

Renewed Focus on Lake Ontario
TRCA recognizes the importance of the many new activities outlined in the draft COA for Lake Ontario and is pleased to see a renewed focus on the Lake given that the previous COA focused mainly on Lake Erie. The renewed focus is timely as it aligns with major economic growth pressures experienced in the Greater Golden Horseshoe. This is a key improvement given that scientific understanding learned, and policy positions developed for Lake Erie (and as well for Lake Simcoe and Georgian Bay) may not be directly transferable to Lake Ontario. Therefore, we appreciate that the new COA and the new draft Lake Action Management Plan (LAMP) for Lake Ontario recognize the key role for Lake Ontario's science community to investigate the lake and make "lake specific" recommendations to COA Executive Committee and the LAMP Committee.

Implementing Mechanisms
Although TRCA supports the proposed actions and goals ("Results") in the COA, we find that many actions lack specifics on implementation. For example, phrases such as "work with", "promote", "build on" are used but the mechanisms for triggering the effect of these actions on the ground (with implications for water quality and ecosystem health) are not referenced. Therefore, the COA could benefit from some indication of the tools each level of government, other agencies and partners might use to implement the important commitments described, which in turn would indicate the lead and supporting ministry or department. If not stipulated within each action or set of actions, this could be stated in a preface or an appendix to the COA to outline legislation, policies and regulations related to the Annex topics, where applicable. For example, under Annex 3, Wastewater and Stormwater component, the *Ontario Water Resources Act* - section 53 Certificates of Approval, could be cited as

an example of an implementing mechanism, supported by technical guidance of a comprehensive update to the provincial Stormwater Management Planning and Design Manual (2003).

Other mechanisms for implementation of commitments made in the COA may be through land use planning policy and infrastructure planning. Including reference to the planning process, environmental assessment process and infrastructure master planning would better emphasize the connection between continued land development and water quality and ecosystem health. Annex 5, Areas of Concern, makes this connection in its preamble, but this should be a more prevalent theme throughout the COA. For example, there could be an upfront commitment in the COA for the Province to promote the environmental sections of the Provincial Policy Statement to recognize the link between, not only protection of coastal natural heritage, but the importance of natural heritage system planning throughout watersheds for downstream benefits to the Great Lakes.

This approach could also be taken for federal and provincial support in the COA of the Source Protection Plans under the *Clean Water Act*. It could be emphasized that Canada and Ontario support municipal implementation of the Source Protection Plans for the contribution it makes to lake health, particularly for those municipalities with Intake Protection Zones in the Great Lakes.

The exercise of listing key mechanisms could also serve as a gap analysis of sorts, given that it may reveal where actions from the COA do not have an existing pathway for implementation. A partner survey may also be helpful to determine if other agencies are already working in the same areas and are able to pool resources to avoid duplication and enhance efficiencies for the actions in the COA.

Implementing Funding

Further to the above, resources and funding are crucial for supporting agencies that have the demonstrated ability to leverage partnerships and other types of collaboration to help achieve the actions in the COA. Indeed, TRCA's and other levels of governments' ability to deliver on the partnerships referenced in the new COA will depend upon the availability of resources. Past TRCA program contributions were undertaken in collaboration, and with the financial support, of municipal, provincial, federal, and non-government partners.

For partnerships to succeed, it may be beneficial for staff from all levels of government to attend meetings and information exchanges. While there have been limitations on travel imposed by governments, there should be consideration going forward to consider certain exceptions to allow travel within the Great Lakes area. This would be especially important for projects that require inter-agency and inter-governmental cooperation among subject matter experts.

Recent shifts in support at the provincial level to conservation authorities and municipal partners may have an impact on our abilities to contribute to the partnerships identified in the COA. It is important that the Province recognize the commitments made when it is developing its open for business policy and economic and growth management strategies.

TRCA Comments and Recommendations

TRCA staff with technical expertise in each Annex have reviewed the draft COA and have provided detailed comments and editorial suggestions in the attached table (Appendix 2). In consideration of these and of the general comments above, TRCA makes the following recommendations for the Ministry's consideration:

- COA employs a holistic lens and reflects a watershed approach to supporting lake health; this approach should be replicated in the update.

- Introduce a section or an appendix on implementation mechanisms, targeted timelines and funding;
- That the connection between land development and lake water quality and ecosystem health be a more prevalent theme throughout the COA;
- Maintain the ability of the current COA to encourage partnerships between agencies and the leveraging of funds for greater impact;
- Ensure a continuum of current and long-term program funding for TRCA and agencies/ministries with whom we collaborate to deliver on COA actions;
- Make new funding available in support of land-based actions such as watershed planning, stewardship and restoration (perhaps under the Western Lake Ontario Land to Lake Initiative).
- Maintain an ongoing commitment to the de-listing of Areas of Concern and to monitoring, community engagement, and maintenance following de-listing.

We trust that the above and the two detailed appendices are clear and of assistance. Thank you once again for the opportunity to provide input on the proposed new Great Lakes Canada-Ontario Agreement. Should you have any questions or wish to discuss any of the above, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

CC (by e-mail only):

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Appendix 1

TRCA Programs Contributing to the Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health

ANNEX 1: NUTRIENTS
PURPOSE: To address the issue of excess nutrients and reduce harmful and nuisance algal blooms.
SUMMARY OF ANNEX • The reasons for the occurrence of algal blooms are now more complex than in past decades. The introduction of invasive species such as zebra and quagga mussels and round gobies, changes in agricultural production systems, increased urbanization, and climate change are all contributing factors. • The Great Lakes are currently experiencing nutrient levels that impair human use and result in harmful effects on ecosystem functions. This Annex recognizes that the continued environmental, social and economic health of the Great Lakes basin requires the effective and efficient management of nutrients from human activities. • It addresses the need for improved understanding of nutrient issues while continuing to develop and promote actions to improve nutrient management and to reduce inputs from wastewater and stormwater.
TRCA INVOLVEMENT • TRCA is participating in tributary loading studies that are contributing to improved knowledge and understanding of phosphorus sources, the forms of phosphorus being discharge to Lake Ontario and their seasonal characteristics. • TRCA is monitoring nearshore and coastal marsh water quality in Ajax –Pickering nearshore area with support from York and Durham Regions and MECP and ECCC. • TRCA collaborated in water quality studies looking at eutrophication issues in the Toronto Harbour. • TRCA helping City of Toronto with wet weather flow study (tributary & watershed monitoring). • TRCA helping MECP and ECCC with monitoring of nuisance algae and lakebed biota in Lake Ontario. • TRCA next generation of watershed studies- e.g. the Carruthers will promote local actions to improve nutrient management in both urban and rural areas. • STEP program offers significant advancements in LID and stormwater technology. • TRCA has Rural Clean water, restoration and stewardship programs that address sources of nutrients. • Regional Watershed Monitoring Network & Watershed Report Cards & RWMN Program Reporting document current nutrient conditions and trends within the TRCA. • TRCA provides plan input and review services related to development in regulated areas, including dogs off leash parks. Dog waste can be a contributor to nutrient loading in our watersheds. Particularly in the City of Toronto, where these facilities are often located within valleylands. TRCA staff work with municipal staff to ensure appropriate site drainage and servicing schedules, including flushing infrastructure, to minimize nutrient impacts on the watercourses.
TRCA INTERESTS • More work needs to be done on Lake Ontario. • There is a lot of scientific work needed to establish if additional nutrient reduction targets are needed for Lake Ontario • These studies need to consider ecology of the lake and fisheries it supports. • TRCA is interested in being part of this target setting effort when the focus turns to Lake Ontario. • TRCA proposing Citizen science algae watch to document current conditions and hot spots.

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- TRCA's Next Generation Watershed Plans for its watersheds will focus on establishing better land to lake interactions and provide guidance on policy recommendations, stakeholder and community actions. We need to work closely with the Provincial and Federal government to make sure COA Goals are addressed.

ANNEX 2: HARMFUL POLLUTANTS

PURPOSE: To guide cooperative and coordinated actions to reduce or eliminate harmful pollutants into the Great Lakes Basin.

SUMMARY OF ANNEX:

- Under the 1994 Canada-Ontario Agreement, specific harmful pollutants were targeted for action:
  - **Tier I Substances** (chemicals targeted for virtual elimination or zero discharge from sources within the Great Lakes as well as for global efforts to eliminate out-of-basin sources)
  - **Tier II Substances** (chemicals that had the potential for widespread impacts in the Great Lakes or were already causing local adverse impacts).
- Canada and Ontario are actively engaged in programs and initiatives designed to assess and manage the risks posed by certain chemicals to human health and the environment.
  - Federal – Chemical Management Plan, National Pollutant Release Inventory, Stockholm Convention on Persistent Organic Pollutants, Convention on Long-Range Transboundary Air Pollution.
  - Ontario – *Toxics Reduction Act, 2009*, Toxics Reduction Strategy, local air quality regulations

COMMITMENTS:

1) Complete a status report of chemicals identified as Tier I and Tier II substances;
2) Establish a Canada-Ontario Chemicals Management Committee;
3) Establish a process to identify Chemicals of Concern in the Great Lakes;
4) To cooperate on specific research, monitoring, surveillance, and risk management actions for these Chemicals of Concern; and
5) Take actions to reduce risks and impacts from environmental emergencies and spills, and from stormwater and wastewater contaminant loadings.

TRCA INVOLVEMENT:

- TRCA supports the work of municipalities and other stakeholders to increase diversion of materials containing Tier I and Tier II substances from the waste stream (i.e., Partners in Project Green);
- Continues education and outreach initiatives and activities to reduce releases of legacy substances through the promotion of environmentally sound practices and pollution prevention measures (i.e., Children's Water Festival participation).
- Supports and enhances stewardship programs to improve waste diversion, take-back and proper disposal of harmful pollutants (i.e., General education and outreach, policy implementation under the CTC Source Protection Plan);
- Works with academia, industry, municipalities and stakeholders to promote the development of green technologies and activities supporting green chemistry (i.e., Sustainable Technologies Evaluation Program);
- Continues to cooperate on activities to support the prevention of, preparedness for, response to and recovery from environmental emergencies and spills in the Great Lakes basin (i.e., Collaboration on implementation of CTC Source Protection Plan Policies related to Lake Ontario with the City of Toronto, Durham Region, Peel Region, and the Ministry of the Environment, Conservation and Parks.

- Monitors the performance and effectiveness of stormwater and green infrastructure projects and communicate results (i.e., Sustainable Technologies Evaluation Program, Sustainable Neighbourhoods); and
- CTC Source Protection Plan requires the Province to review, amend or establish Environmental Compliance Approvals to ensure appropriate terms and conditions are in place to prevent a sewage treatment plant by-pass discharge to surface water or sewage treatment plant effluent as a result of a disinfection interruption at a Waste Water Treatment Plant (WWTP Diffuser).
- TRCA provides plan input and review services related to development in regulated areas, including roads, parking lots and salt storage facilities. Salt is a major contributor to watercourse toxicity in our watersheds. TRCA staff work with municipal staff to ensure appropriate site/road drainage to minimize salt impacts on the watercourses.
- TRCA will continue to work with municipal and provincial agencies to develop strategies and policies to minimize salt runoff to watercourses and wetlands, including appropriate draining and buffers.

ANNEX 3: DISCHARGES FROM VESSELS

PURPOSE: To ensure that discharges from vessels do not adversely impact the Great Lakes.

SUMMARY OF ANNEX:

- The federal Parliament has exclusive jurisdiction over navigation and shipping. Existing laws, regulations, regulatory programs, inspection protocols and enforcement regimes are designed to address threats to the Great Lakes from vessel discharges.
- The Canada-United States Great Lakes Water Quality Agreement includes commitments to protect the Great Lakes from the discharge of ballast water, oil, hazardous polluting substances, garbage, wastewater, sewage, AIS, pathogens, and antifouling systems.
- The most recent binational report on Great Lakes water quality (April 2012) indicated that, with the exception of AIS found in ballast water, the impact on the Great Lakes from these (potential) discharges is low.

COMMITMENTS:

6) Actions to continue implementing existing ballast water and discharge requirements;
7) To advance new treatment technologies and control measures for AIS, and
8) To ensure that canals and waterways are considered in measures to prevent and control AIS.

TRCA INVOLVEMENT:

- The Lake Ontario Collaborative Group (Toronto, Durham, Peel, MECP) is considering discharges from vessels as an alternative spill scenario (and impact on municipal drinking water intakes drawing water from Lake Ontario) to investigate as an update to the CTC Source Protection Plan.

ANNEX 4: AREAS OF CONCERN

PURPOSE: To restore water quality and ecosystem health in Areas of Concern (AOCs) and includes the goals of completing priority actions for delisting in five "goal 1" AOCs.

- Trca Involvement:
- TRCA administers the Toronto and Region Remedial Action Plan for the Toronto Area of Concern (AOC).
- Toronto is one of the 43 original AOCs identified in the mid-80s which were more impaired than other sites around the Great Lakes. Each AOC a Remedial Action Plan to address specific impairments (called Beneficial Use Impairments or BUIs).

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- Ontario has de-listed three AOCs, has 3 "Goal 1" or high priority AOCs outlined in COA, and the remaining are "Goal 2" AOCs. Toronto is currently a "Goal 2" AOC.
- TRCA has a 5 year (2015-2020), $2.5 million agreement with ECCC and MECP (matching funding) for administration of the Toronto RAP.
- Toronto has re-designated 4 BUIs – fish deformities, degradation of benthos, restrictions on dredging, bird deformities. A re-designation report for the aesthetic BUI is nearly complete and will be submitted to ECCC and MECP by the end of March.
- Actions taken to improve the Toronto AOC have resulted in:
- More swimmable beaches - 8 of 11 beaches are now Blue Flag certified.
- Improved water quality – Phosphorous levels along the waterfront now meet RAP targets.
- Decrease in contaminants in fish so that there are no longer restrictions on consumption for most fish.
- Improved aesthetic conditions of watercourses and the waterfront.
- Protection and creation of fish and wildlife habitats along the Toronto waterfront and Watersheds (e.g. Tommy Thompson Park wetlands, Mimico Waterfront Park, Spadina Quay Claireville Conservation Area and Rouge National Urban Park.)
- The Toronto Waterfront Aquatic Habitat Restoration Strategy (TWAHRS) was developed by TRCA in partnership with MNR and DFO, and in consultation with the City of Toronto and Waterfront Toronto to guide Toronto AOC restoration initiatives and address the fish and wildlife habitat and populations Beneficial Use Impairments (BUIs) under the RAP. The Strategy offers an integrated resource planning approach to achieve a net gain in aquatic habitat on the Toronto waterfront and provides a framework for restoration of these habitats.
- In 2007, Aquatic Habitat Toronto (TWAHRS Implementation Team) was established to provide the opportunity for waterfront project proponents to work with the relevant resource management agencies in a more time and cost-effective manner, and to apply science to support sustainable waterfront development. The Implementation Team includes representatives from TRCA, MNR, DFO, City of Toronto, and Waterfront Toronto. The main objective of the Implementation Team is to ensure that the approval of waterfront projects facilitate strategic improvements to aquatic habitat by providing information on waterfront environmental conditions, provide design advice to realize aquatic habitat improvements, and help coordinate the regulatory review and approval of the project.
- TRCA provides plan input and review services related to infrastructure and land development in regulated areas. TRCA staff work with municipalities and developers to avoid, minimize, restore or compensate for impacts related to the natural heritage system in our jurisdiction.

TRCA INTERESTS:

- Continue to fund AOC programs and the associated RAPs. We are very close to de-listing (2025) and it is worthwhile to keep funding the RAPs to address the 6 remaining impairments (2 of which are in the process of being re-assessed).
- Toronto is currently a "Goal 2" AOC, but given the improvements we've made and our work plans for the next 5 years, we could recommend moving up to a "Goal 1" AOC.
- Through the infrastructure and land use development processes, TRCA planning staff work with TRCA Restoration and Infrastructure staff to ensure restoration and compensation requirements are directed toward strategic areas to address RAP AOC areas of interest.

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ANNEX 5: LAKEWIDE MANAGEMENT

PURPOSE: To advance restoration, protection and conservation of the Great Lakes through collaboration among jurisdictions domestically and binationally and with the Great Lakes community on a lake-by-lake basis.

SUMMARY OF ANNEX:

Lakewide Action and Management Plans (LAMPs) provide a mechanism to assess and report on the state of the ecosystem, identify science and management priorities, conduct studies and outreach activities, and identify the need for and facilitate further action. It also contains commitments to develop Lake Ecosystem Objectives, a new nearshore framework, and consult and cooperate with the Great Lakes community to assess the status of each Great Lake and address environmental stressors on a lakewide scale.

The nearshore areas of the Great Lakes have great biological diversity, provide numerous benefits and are the focal point for human interaction with the Lakes but are also subject to tremendous human impact. The Great Lakes are Ontario's primary source of drinking water.

COMMITMENTS:

To further assess and address threats to sources of drinking water in connection with efforts under Ontario's ***Clean Water Act, 2006*** as well as through existing federal policies and programs.

TRCA INVOLVEMENT:

- TRCA participates on both Lake Ontario LAMP Management Committee and Working Group.
- LAMP help to address program needs in Durham Region (who's watershed and waterfront are outside of the Toronto AOC).
- Through LAMP Annex, lakewide issues such as reappearance of Cladophora can be best addressed.
- TRCA staff contribute to preparation of annual reports and participated in drafting new 5 Year LAMP Management Plan document
- TRCA contributed to developed of Lake Ecosystem Objectives for Lake Ontario
- Participated in development of nearshore framework and will help support its application in Lake Ontario.
- Helped develop Western Lake Ontario Land to Lake initiatives that connects land activities and management actions by CA and municipalities with the health of Lake Ontario
- One of several policies in the Credit Valley – Toronto and Region – Central Lake Ontario (CTC) Source Protection Plan (SPP) is to encourage collaboration on protecting our shared drinking water sources; and raise the profile of the importance of Lake Ontario as a source of drinking water for Ontario residents. TRCA is a partner in engaging with municipal, provincial, national, and international stakeholders on this outreach.
- Toronto and Region Source Protection Authority in collaboration with the CTC Source Protection Committee has delineated vulnerable areas around the drinking water intakes on Lake Ontario which fall within the conservation authority's jurisdiction.
- TRCA is a participant on the Lake Ontario Collaborative Group, a partnership between the Ministry of the Environment, Conservation and Parks, Environment and Climate Change Canada, the Region of Peel, City of Toronto, and Durham Region, which focuses on the implementation of policies from the CTC SPP intended to protect Lake Ontario as a source of drinking water. Some of the activities that this group is engaged in includes:
    - Sharing information about Lake Ontario circulation and water quality monitoring; and
    - Sharing environmental monitoring data and using modelling to inform research on topics such as, but not limited to:

a) the effectiveness of risk management measures and spill contingency measures;
b) cumulative impacts of point and non-point sources of contaminants on nearshore water quality; and
c) the effectiveness of Source Protection Plan policies in reducing the risk related to pathogens (not limited to E. coli), including identifying the pathogens and the respective densities at different times; assessing the associated risk at intakes due to pathogens in non-disinfected wastewater and other known specific sources of these pathogens; and undertaking quantitative microbial risk assessments, using a structured research and development design (such as based on the protocols established by the US EPA), to assess the threat and adequacy of existing treatment on a plant-by-plant basis.

- To protect drinking water sources on Lake Ontario from potential spills along highways, shipping lanes and railways, the CTC SPP requires that contingency plans incorporate risk reduction and mitigation measures, where appropriate.
- A water budget has been completed across TRCA's entire jurisdiction to comply with the requirements of the Clean Water Act, 2006. This information will augment the understanding of the water budget for the entire Great Lakes basin.

TRCA INTERESTS:

- New resources are needed to support TRCA in delivery of programs and services as a LAMP partner. Contributions to date come largely through municipal funding partnerships.

ANNEX 6: INVASIVE SPECIES

PURPOSE: To ensure cooperative and coordinated efforts to reduce the threat of aquatic invasive species to Great Lakes water quality and ecosystem health. It includes a commitment to understand and respond to the potential for new or expanded ranges of Aquatic Invasive Species in the Great Lakes.

TRCA INVOLVEMENT

- Under contract with DFO TRCA implements the Toronto Area portion of the Asian Carp Surveillance Program. It's a strategic monitoring program which targets Asian Carps along the Toronto Waterfront. The scope of the program is two-fold, targeting areas (a) that are habitats that are suspected to have high potential for sustaining Asian Carps, and (b) where Asian Carps have been reported during past monitoring efforts. With these data, TRCA, its partners and provincial and federal agencies will be better equipped to reduce the threat of the Lake Ontario ecosystem destruction by the highly invasive Asian Carps as well as implement an adaptive management approach of aquatic habitats, particularly coastal wetlands.
- Under contract with DFO TRCA implements the Toronto Area trapping portion of the Sea Lamprey control program. This project involves operating Sea Lamprey traps in the Humber River and Duffins Creek during the Lamprey seasonal migration upstream (April - June). Trap operation involves removal and counts of Lamprey, performing mark and recapture on selected individuals, and identification of by-catch fish.
- TRCA provides plan input and review services related to development in regulated areas. Wherever possible, TRCA supports municipalities and other agencies in the removal of invasive species and incorporates the benefits of such removals in negotiations for natural heritage restoration or compensation.

ANNEX 7: HABITAT & SPECIES

PURPOSE: To continue efforts to restore, protect and conserve the resilience of Great Lakes native species and their habitats.

TRCA INVOLVEMENT:

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- The RAP and GLSF (Great Lake Sustainability Fund) have supported a large number of strategic habitat restoration project including: Coastal Wetland Creation (e.g. Cell 2, Cell 1, etc), Watershed Signature Wetlands (McMichael Gallery, Toronto Zoo), Habitat Regeneration (Professors Lake, Humber Bay Park, Toronto Islands). These projects have levered substantial financial project support including an investment for TTP Cell 2 from Coca Cola Canada in a Private Public partnership valued over 3 million dollars.
- TRCA has developed and delivered over 5.7 million dollars of strategic habitat restoration projects since 2014.
- TWAHRS Fish Habitat Assessment -Assess restoration and rehabilitation efforts to aquatic habitat along the Toronto Waterfront. Specifically, this includes evaluating the effectiveness of restoration techniques from the Toronto Waterfront Aquatic Habitat Restoration Strategy (TWAHRS) compendium of restoration techniques. This will be accomplished by calculating rehabilitation area by habitat type (embayment/wetland, open coast and rivermouth), restoration sites. Aquatic Habitat Toronto (AHT), Fisheries and Oceans Canada (DFO), Environment Canada and Climate Change (ECCC), Ministry of Natural Resources and Forestry (MNRF), City of Toronto, Ports Toronto and Waterfront Toronto.
- Rap and GLSF has supported the development and delivery of a number of strategic habitat planning initiatives including: the **Integrated Restoration Plan (IRP)** for the TRCA watersheds. This strategic habitat planning has defined prioritized restoration activities including forest cover, wetland, and riparian habitats on a watershed catchment basis. **Toronto Habitat Banking** Development and delivery of a DFO ready habitat banking scheme to improve regulatory approval process for projects. **"Fishing in Your Backyard – An Urban Recreational Fisheries Strategy for the Lake Ontario Northwest Waterfront"** which fostered a $2.5 million investment from the City of Toronto to improve waterfront fishing access. These Strategic watershed planning initiatives supports annex 4, 9 and 10
- RAP and GLSF funding supported the development of the TRCA Terrestrial Natural Heritage System Strategy – a strategy that identified the amount and distribution of habitat required to protect and restore biodiversity within the TRCA jurisdiction. The science and approach to natural heritage planning advanced through the development of the strategy has helped to inform a number of TRCA and municipal ecosystem management and land use planning initiates and has significantly contributed to improved restoration, protection and management of the natural system. This also helps support Annex 4 and 10
- Urban developed has been the major driver of habitat and species loss within the TRCA jurisdiction. RAP and GLFS funding have supported the development of a number of technical guidance tools to inform land use planning, helping to ensure natural features and systems are protected through the land use planning process. The suite of wetland water balance guideline documents as well as the guideline for determining ecosystem compensation have both been developed with support from RAP and GLFS funding. This also helps support Annex 4 and 10.
- Ontario Climate Consortium Secretariat supports Annex 7 by convening stakeholders to discuss Resilience Thinking and climate change vulnerability best practices associated with coastal wetlands.
- Through the TRCA plan input and review process, TRCA supports conservation and restoration of native species throughout our watershed for both infrastructure and land use development projects.

TRCA INTERESTS:

- Advance progress on priority actions for the loss of fish and wildlife habitat and the degradation of fish and wildlife populations Beneficial Use Impairments. This project will evaluate the effectiveness of restoration efforts in the Toronto AOC by TRCA that have been implemented to support priority projects from the TWAHRS.

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ANNEX 8: GROUNDWATER QUALITY

PURPOSE: To gain a better understanding of how groundwater influences Great Lakes water quality and ecosystem health, and to identify priority areas for future action.

SUMMARY OF ANNEX:

- Groundwater may represent as much as 50 percent of the water entering the Great Lakes, either directly (via groundwater discharge along the coasts) or indirectly (via discharge into rivers and streams that then discharge into the lakes).
- Groundwater-based contaminants and excessive nutrients can impair the quality of the waters of the Great Lakes, particularly the nearshore region, with potential effects on aquatic species and recreational waters.
- Groundwater quality in the Great Lakes is linked to the successful delivery of key commitments in other Annexes, including Areas of Concern, Lakewide Management, Harmful Pollutants, Nutrients, and Habitat and Species.

COMMITMENTS:

1) To develop a binational state of Groundwater Science Report;
2) Create an interagency groundwater issues team;
3) Identify priorities for future research, and
4) Identify priority areas and sites for monitoring, management or remediation actions to address groundwater impacts and stressors.

TRCA INVOLVEMENT

- The Groundwater Science Report was released for public review in December 2015 and Conservation Ontario provided a letter of support.
- TRCA has a representative on the Annex Sub-Committee. This committee continues to work on development of a groundwater indicator (e.g. nitrates - rural, chlorides - urban) for the Annex 10 science indicators project.
- As a member of the Oak Ridges Moraine Groundwater Program, TRCA has supported the augmentation of groundwater knowledge.
- Municipally funded YPDT Groundwater program is supported by CLOCA and housed at TRCA. This program has made significant progress in harmonizing data and models across GTA and can be a valuable resource for this Annex.
- TRCA provides plan input and review services related to development in regulated areas. In areas where groundwater dewatering may impact surficial features such as wetlands and baseflow in watercourses, and hence their habitats, TRCA requires comprehensive mitigation and monitoring strategies be developed and employed.

ANNEX 9: CLIMATE CHANGE IMPACTS

PURPOSE: To build an understanding of climate change impacts and advance integration of knowledge into Great Lakes adaptation and management strategies.

TRCA INVOLVEMENT:

- TRCA serves as the Secretariat for the Ontario Climate Consortium (OCC). OCC brings together researchers from some of Ontario's leading academic institutions.
- TRCA /OCC also collaborates with GLISA – Great Lakes Integrated Science Assessment Program based our of University of Michigan.
- OCC offers support to Annex 9, Climate change Impacts, in identifying climate science knowledge gaps and convening experts around climate modeling and information at the Great Lakes Basin scale
- OCCC sits on the Annex 9 Extended Subcommittee (Climate Change Impacts).

- OCCC provides support to the Development of Great Lakes Annual Climate Summary (jointly produced by Annex 9 - Climate Change Impacts and Annex 10 - Science)
- OCCC also provides climate change related support to Annex 7, Habitat and Species, by convening stakeholders to discuss Resilience Thinking and climate change vulnerability assessment best practices associated with coastal wetlands.
- The 2017 update to the Ontario *Environmental Assessment Act* requires proponents to address impacts to climate change in all assessments. TRCA works closely with proponents to ensure such impacts are addressed, as related to flood and erosion control and natural habitat resilience.

TRCA INTERESTS:

- Continue to support and invest in climate science and research TRCA/ OCC.
- Contribution to the scientific knowledge and understanding of Lake Ontario impacts and strategies through local and regional science and actions.
- TRCA is hosting a workshop with environmental assessment practitioners to address climate change impacts in infrastructure development, thereby ensuring consistency and relevance of approaches as it relates to TRCA's mandate and interests. TRCA Infrastructure Planning and Permits will partner with OCC in this regard.

ANNEX 10: SCIENCE

PURPOSE: To enhance the effectiveness and efficiency of Great Lakes science activities through planning, cooperation, coordination and communication.

SUMMARY OF TRCA INVOLVEMENT:

- TRCA's Environmental monitoring activities along the Toronto and region waterfront are an important component of TRCAs Lake Ontario shoreline monitoring program. Understanding environmental conditions of the shoreline provides significant information and input into the restoration projects planning and implementation. Scientific information is used for effective decision making and for reporting on the conditions and progress in achieving environmental objectives and defining appropriate and necessary actions. Monitoring focuses on documenting local and regional conditions and bio-physical attributes of the shoreline. Monitoring activities include fish community surveys, wetland monitoring, bioaccumulation monitoring, sediment surveys, and aquatic habitat surveys.
- TRCA in cooperation with Aquatic Habitat Toronto (AHT), Fisheries and Oceans Canada (DFO) Science Group, and Carlton University, are continuing a study to monitor the abundance and health of the fish community inhabiting the Toronto Harbour. The study utilizes acoustic tags and receivers to allow researchers a more complete view of the individual fish activity throughout the entire year. Tagged fish are tracked throughout the inner and outer harbours of Toronto, including areas that underwent habitat restoration. Moreover, tagged fish movements are tracked by receiver networks installed outside of the Toronto area (e.g., Hamilton Harbour), providing a more complete picture of fish movement and habitat utilization along the north-western coast of Lake Ontario.
- Near Shore Community Index Netting (NSCIN) assessed fish community status for Toronto Harbour— fish community assessments of the Toronto Harbour were focused in the areas of Tommy Thompson Park and the Toronto Islands. Evidence collected toward maintenance or improvement in IBI scores and aquatic ecosystem health generally.
- The RAP and GLSF recognize the importance of assessing progress towards ecosystem goals and learning from past experience. As such important monitoring and evaluation studies have been supported such as Evaluating the Status of Wildlife Habitat Loss and Degraded Wildlife Populations. This study developed a number of key recommendations for additional actions to further protect wildlife and habitat within the Toronto region. This also helps support Annex 4 and 7.

- The Great Lakes Protection Initiative is currently supporting the development of wetland key performance indicators, helping to develop a framework for monitoring and reporting on the success of wetland restoration projects. This also helps support Annex 4 and 7.

TRCA INTERESTS:

- Provides a critical understanding of ecological conditions associated with our restoration project sites.
- Contributes directly to TRCA's Toronto Waterfront Aquatic Habitat Restoration Strategy (TWAHRS)
- Contributes Directly to Toronto's area of concern (RAP objectives)
- Benefits the City's Waterfront Revitalization Plans, Contributing to Waterfront Toronto's activities in waterfront development and waterfront park planning.
- Toronto Water Pollution Objectives: Water Quality - meet guidelines for water and sediment quality
- Water Quantity - reduce erosion impacts on habitats and property
- Natural Areas and Wildlife - protect, enhance and restore natural features and functions
- Natural Areas and Wildlife - achieve healthy aquatic communities
- Natural Areas and Wildlife - reduce fish contamination.
- Contributes to scientific knowledge and understanding of environmental health with jurisdictional boundaries and connections within a regional context.

ANNEX 11: PROMOTING INNOVATION

PURPOSE: To create long-term, environmentally sustainable economic opportunities that improve water quality and ecological health and contribute to the well-being of the Great Lakes community. It includes working with companies to commercialize their new technologies in the water sector/market.

TRCA INVOLVEMENT:

- The annex is aligned with the TRCA strategic plan strategy 1 - green the Toronto region's economy.
- Facilitated the market adoption of effective new green building practices and technologies throughout the jurisdiction. For example, in partnership with industry, TRCA piloted new construction technologies at The Living City Campus at Kortright Centre for Conservation; encouraged the adoption of more sustainable practices and new building technologies in new developments (e.g., Toronto Waterfront), and designed a new head office that demonstrates leadership in green office building design and construction.
- Helped create and strengthen partnerships between public, private, institutions and non-profit sectors to support the adoption of green infrastructure policy and investments by senior levels of government across the jurisdiction through the Green Infrastructure Ontario Coalition, Eco Health Ontario and the Ontario Climate Consortium.
- Partners in Project Green Eco-Zone program is a public-private partnership that works to enhance adoption of new technologies and turn sustainable practices into economic gains for businesses
- Sustainable Technologies Evaluation Program (STEP) Water, a partnership between TRCA, CVC, and Lake Simcoe Region CA, has received funding through GLSF, GLPI and the RAP. STEP focuses on technologies within the following key focus areas:
    - Urban runoff and low impact development;
    - Erosion and Sediment Control;
    - Healthy Soils;
    - Salt Management; and
    - Protection of Natural Features and Systems.

TRCA INTERESTS:

- Continued support of innovation and particularly in the creation of environmentally sustainable economic opportunities.

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ANNEX 12: COMMUNITY ENGAGEMENT
PURPOSE: To empower communities by providing opportunities for individuals and groups to enjoy and help take care of the Great Lakes.
TRCA INVOLVEMENT: TRCA serves an expanding population of over 3.5 million citizens across six 18 upper, single and lower tier municipalities, nine watersheds and Lake Ontario. Community Engagement activities are in large part undertaken in support of TRCA's Strategic Plan, watershed and waterfront plans, municipal programs and multi-partner strategies such as the Remedial Action Plan (RAP) and Canada-Ontario Agreement (COA) on Great Lakes Water Quality and Ecosystem Health. • Engagement activities are also focused around specific watershed land uses and stakeholders such as neighborhoods and business. • TRCA programs build capacity and community environmental leadership to undertake independent local actions towards the improvement and protection of watershed and great lakes health • TRCA engagement and education programs promote positive behavioral change that fosters individual and social health and well-being. • Through a diverse range of engagement programs and activities (listed below) TRCA provides year-round opportunities for communities and stakeholders to contribute to the protection and better understanding of Great Lakes and watersheds: 1) Community-Based Engagement Programs – watershed and shoreline clean-up, restoration, citizen-science, learn to fish, sustainable neighbourhoods 2) Education and Training Programs – educational workshops, school programs and day camps and educational resources and new Canadian outreach. 3) Community/Watershed Engagement Events 4) Public Stakeholder Consultations 5) TRCA Parks and Campgrounds Programs 6) Watershed and Stewardship Committees such as Regional Watershed Alliance and Youth Council • TRCA works with municipal, provincial and federal agencies to provide development and infrastructure review and comment as related to our mandate and interests. Through this work, TRCA planning staff advocate for community and public realm benefits be included in the projects wherever practicable.
TRCA INTERESTS: • TRCA will continue to proactively seek involvement with and outreach to a broad cross-section of the Toronto region population to support the goals and objectives of COA and RAP (beyond delisting of AOC).

ANNEX 13 & 14: METIS & FIRST NATION ENGAGEMENT
PURPOSE: To highlight the interests and important role of Metis and First Nations as participants in the restoration, protection and conservation of the Great Lakes. It includes collaborating with Metis and First Nations in the delivery of the Agreement and opportunities to collaborate with Metis and First Nations on traditional knowledge.
TRCA INVOLVEMENT: • TRCA supports the goals of collaborating with First Nations and Métis and enhancing consideration of traditional knowledge:

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• TRCA endeavors to engage first Nations and Metis Nations through our various programs. Mandatory engagement through environmental assessment process is a provincially delegated responsibility. TRCA's mission specific engagement programs have been successful in establishing excellent relationships with both Metis Nations and First Nation communities. Some of these programs include, watershed events, promotion of human heritage of TRCA's watersheds and rivers, healing gardens, archeology etc..
TRCA INTERESTS: • We encourage senior governments to lead the charge on Metis and First Nations engagement. • Regional forums, supported by capacity-building funding, would enable conservation authorities to build local relationships with First Nations and Métis to support mutual watershed-based goals. • TRCA encourages additional efforts to integrate traditional knowledge and western science into decision-making on Great Lakes issues.

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Toronto and Region Conservation Authority

Appendix 2

TRCA Detailed Comments (August 2019) on the Draft Canada-Ontario Great Lakes Water Quality and Ecosystem Health, (ERO#019-0198)

Definitions	(g) "Great Lakes community" – TRCA is pleased to see conservation authorities are a part of this community along with municipalities and other stakeholders. (j) "Ontario's Environment Plan" is referred to as "the 2018 draft document"; We understand the Plan was final as of November 2018 and can be referred to as such.
Administration of the Agreement – COA Executive Committee	(f) As a member of the "Great Lakes community", TRCA would be pleased to meet with the COA Executive Committee and other members at roundtable discussions as it relates to our jurisdiction.
Annex 1: Nutrients	The call for nutrient reductions is a critical component of the Agreement. TRCA is an active participant in this research effort. Should future reductions be required, TRCA supports "ecosystem considerations" in any nutrient reduction target setting exercise; given the significance of the recreational fishery in Lake Ontario and the damaging impact of invasive mussels that changed the nutrient pathways in the Lake. TRCA has made significant investments in restoring fish communities and aquatic habitat in Lake Ontario, which requires a balance in nutrient allocation to ensure continued productivity of this fishery. TRCA has the knowledge to help target areas for these nutrient reductions and have advanced programming to implement urban and rural nutrient management strategies and best management practices across our watersheds. TRCA agrees there are a number of complementary initiatives that contribute to reducing nutrient loading in the Great Lakes, including research and monitoring, green infrastructure promotion and generally, improvements in urban and rural land use and land management practices. TRCA suggests that the agencies' work planning include working with partners, such as municipalities and conservation authorities, to develop watershed plans for key priority watersheds as a means of identifying science-based local level actions required to reduce the risk of excess nutrients, and wastewater and stormwater pollution. As provincial policy requires municipalities to undertake watershed plans to inform development and infrastructure planning decisions

	(including stormwater and wastewater master plans), this is a natural opportunity for collaboration. TRCA's experience from administering our Rural Clean Water Program, undertaken jointly with neighbouring conservation authorities and municipalities, can inform actions to achieve Result 4, which discusses best management practices for reduced risk of nutrient loss from agricultural production. Dog waste is another contributor to nutrient loading in our watersheds and eventually to Lake Ontario. This is particularly true for older established areas like Toronto, where dogs off leash parks are often located within valleylands. Best management practices include vegetated buffers, site drainage and servicing schedules, including flushing infrastructure, to minimize nutrient impacts on watercourses that ultimately make their way to the Lake. Under Result 5, (l) and (m) both of these points mention "decision-making" but are not specific as to under which legislation, policies or regulations decisions would be pursuant.
Annex 2: Harmful Pollutants	Please consider the following revisions: to (b) under Result 4 (Canada and Ontario will): "Complete chronic toxicity testing studies for Polyaromatic Hydrocarbons (PAHs) to ~~develop~~ **create** a body of science sufficient to develop create appropriate Environmental Quality Guidelines." to (a) under Result 5 (Canada and Ontario will): "Support capture and clean up projects ~~for~~ **to remove** plastic pollution from our waterways and land;" Consider revision to (b) under Result 5 (Canada and Ontario will): "Working through the Canadian Council of Ministers of the Environment, ~~support the development of~~ **create** an action plan to implement the Canada-wide Strategy on Zero Plastic Waste" to (g)(ii) under Result 5 (Canada will): "Develop national performance ~~requirements~~ **indicators** and standards ~~including~~ for recycled content, compostability, reparability, and remanufacturing/refurbishment;" to (l) under Result 5 (Ontario will): "Consider **integrating the management of** plastic pollution in**to** wastewater and stormwater policies." to description of Result 6:

	Maintain an accurate scientifically derived inventory of Chemicals of Concern ~~When scientific evidence identifies a need, new Chemicals of Concern are identified and designated, and existing Chemicals of Concern are periodically reviewed for removal.~~ to third paragraph under description of Annex: "Improving wastewater and stormwater management requires significant investments, long-term planning, and clear standards and policies. ~~Many~~ **Multiple** partners play a role **in the successful management of wastewater and stormwater** including federal, provincial, and municipal governments."
Annex 3: Wastewater and Stormwater	There are several actions listed in Annex 3 that conservation authorities can assist with as we have knowledge, expertise, research partnerships, and monitoring programs aligned with the intent the Annex's Results (e.g., water quality and stream discharge monitoring, exploring the water quality benefits of natural features, assessing impacts of salt us on aquatic ecosystems, etc.). Opportunities for further collaboration and partnership exist through watershed planning that gets undertaken jointly by municipalities and municipalities through the land use planning process as mentioned above under Annex 1, Nutrients. In the past TRCA has received special funding through Grant Agreements with both ECCC and MECP – to name a few recent examples: Western Lake Ontario – Land to Lake, Western Durham water quality monitoring program, Frisco Road Stormwater Retrofit study, Small Equine Stewardship Program, Cladophora studies, Community engagement and outreach for programs and activities outside of the Toronto AOC (Durham watersheds). Most recently, TRCA received approximately $400K for tributary nutrient loading studies from MECP. Consider revision to (e) under Result 1 (Ontario will): "Update wastewater **management** policies and develop a new stormwater management policy, **which includes provisions** ~~including policies~~ specific to treatment requirements, ~~the~~ **as well as** sewage overflows and bypasses to enhance environmental protection and reduce nutrient loadings." RE: (l) under Result 2 (Ontario will): While TRCA supports this action given that communication tools are needed about septic system impacts on Great Lakes water quality, it should be noted that municipalities and conservation authorities across the province have developed materials for public

	consumption on septic contaminate risk for drinking water (to comply with Source Protection Plan policies). Re: (m) under Result 2 (Ontario will): Given the impact of harmful algae blooms on the use of public beaches, it is recommended that HABs be listed together with E. coli, as below: "Enhance understanding of the causes of E. coli, **algae,** or other substances that reduce use of beaches;" Re: (o) under Result 2 (Ontario will): Suggest that beach management tool be described, or examples provided in text. With respect to Result 2, (q) (pathways for road salt), Source Protection Regions established under the *Clean Water Act* undertaking an analysis of groundwater's transport pathways, could aid the Province in its goal of assessing pathways for road salt into groundwater. This goal ties into Science Need Area 7 "Improve the understanding of the effects of urban development on groundwater" as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report*. The Sustainable Technologies Evaluation Program could also support the Province in addressing objectives of this Science Need including base data acquisition and monitoring of urban water balances and research on urban groundwater contaminate fate. We note that the removal of sodium and chloride from the Provincial Water Quality Objectives feels at odds with this goal. Salt is a major contributor to watercourse toxicity in our watersheds. TRCA staff work with municipal staff to ensure appropriate site/road drainage to minimize salt impacts on the watercourses. TRCA continues to work with municipal and provincial agencies to develop strategies and policies to minimize salt runoff to watercourses and wetlands, including appropriate draining and buffers.

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Annex 5: Areas of Concern	The Toronto and Region Remedial Action Plan (RAP) for the Toronto Area of Concern (AOC) is the largest program currently supported by the COA. TRCA administers the RAP as part of a 5-year (2015-2020), $2.5 million agreement with Environment and Climate Change Canada and MECP. The COA under the RAP and the Great Lakes Sustainability Fund have fostered the development and delivery of strategic habitat planning and project initiatives that value over 10 million dollars. TRCA projects under the RAP include the Integrated Restoration Plan, Toronto Habitat Banking, "Fishing in Your Backyard – An Urban Recreational Fisheries Strategy for the Lake Ontario Northwest Waterfront", and projects that focus on coastal wetlands and habitat restoration in high profile public spaces. Moreover, through development and infrastructure planning processes, TRCA staff work with municipalities and proponents to ensure ecological restoration projects are directed toward strategic areas to address RAP priorities in the Toronto AOC. Under Result 12 (b) conducting "monitoring of wildlife populations to assess progress towards achievement of delisting criteria" seems out of place given that, while we have monitored wildlife, this is not a priority activity. The reason for listing of the fish and wildlife populations BUI was fish. "Wildlife populations and habitat" was always a joined BUI with fish. In 2015, the RAP determined that the wildlife part of both BUIs needed to be reported on separately as we moved towards delisting these. This was not meant to indicate a lack of concern for wildlife. Rather, there was a focus on the Lake rather than watersheds. Therefore, at that time, there were no real objectives set for wildlife. However, while there are limited opportunities to speak to wildlife if the focus is strictly the Lake, the process to delist allowed the RAP team to do this. Further to the above, another suggested commitment could be for the Toronto RAP team and Aquatic Habitat Toronto to provide financial and technical support to priority actions to advance progress towards achievement of delisting criteria for Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations. Also under Result 12, the Ashbridge's Bay Treatment Plant upgrades will be an additional key action for addressing the beach closures and eutrophication BUIs. The Toronto AOC is on track to delist by 2025. While there is a sunset for the RAP, there is some expectation that efforts and investment will continue once the AOC is de-listed, primarily through monitoring, engagement and maintenance activities to ensure ongoing resilience.

Annex 6: Lakewide Management	Erosion plays a role in impairing water quality so it should be included in the COA. Erosion should be featured more prominently in commitments especially given the high-water level events of 2017 and 2019 in Lake Ontario. In order to accommodate the increased volume and velocity of surface runoff from urbanization, widening and undercutting of receiving waterbodies can occur, in turn causing steep banks to slump and fail during severe storms. In addition, the bed of the watercourse may change due to sediment covering the natural substrate with shifting deposits of mud, silt, and sand, thereby affecting aquatic habitat; downcutting of the channel bed creates instability which can lead to increases in the velocity of stream flow and erosion downstream. Loss of riparian tree canopy cover results from the constant undercutting and failure of the stream banks, exposing tree roots and other woody vegetation that would otherwise serve to stabilize the banks of the watercourse. The impairments from these impacts have ramifications downstream at the river mouth where it meets Lake Ontario. Result 1, (b) in this Annex could be a good point to include wording about erosion threats in riverine and shoreline systems ((b) highlights this arguably under "physical"). Annex 3 where stormwater management is discussed is where another connection could be made to issues of erosion for ecosystem health. We note that erosion is referenced in Annex 10, Climate Change Impacts and Resilience, but the focus in Annex 6 on threats to water quality could include actions regarding erosion. Re: (e) under Result 5 (Ontario will), suggest that action be expanded as follows: "Maintain and/or develop programs to provide education and outreach on the protection of drinking water sources, and to: • identify **and** support actions to mitigate potential threats to source water, • encourage collaboration on protecting our shared drinking water sources; and • raise the profile of the importance of the Great Lakes as a source of drinking water for Ontario. Suggest the addition of another action: Canada and Ontario will work with municipalities responsible for providing water from systems with intakes in the Great Lakes to undertake actions to support the implementation of source protection plan policies to protect these sources of drinking water.
Annex 8: Habitat and Species	Result 1 (a) and (b) - The references to "net habitat gain" and "restoration" imply a habitat off-setting strategy is needed to augment the current protections for habitats under the *Planning Act* and *Environmental Assessment Act* review and approval processes.

	The current review of the Provincial Policy Statement alludes to provincial guidance for municipalities to "manage" non-provincially significant wetlands, however, the Agreement's commitments cited above would require guidance on managing a broader range of habitat.
Annex 9: Groundwater Quality	TRCA is highly supportive of the commitments in the Agreement related to protecting groundwater quality. However, as identified by Conservation Ontario, the link between groundwater quality and quantity is not emphasized. Please see comments above under Annex 3, Wastewater and Stormwater on how conservation authorities might aid the Province in connecting groundwater flow regimes (rural and urban) to groundwater quality and ecosystem health. TRCA is pleased to see the Province committing to updating its SWM criteria and there are commitments in the COA to studying LID and other green water management infrastructure. Nonetheless, the Agreement could benefit from more focus on implementation (see General Comments on Implementing Mechanisms). For example, through our roles in the planning and permitting processes, TRCA provides direction on mitigation in areas where groundwater dewatering may impact baseflow to natural features such as wetlands and watercourses. The Agreement speaks to the importance of monitoring, and provincial responsibilities for that. This is not consistent with the recent MECP decision to reduce funding for the Provincial Groundwater Monitoring Network. Indeed, the reduction in funding seems at odds with the goals outlined in this Annex. Many of the AOCs that fall within conservation authority boundaries and large projects that rely on conservation authority expertise, such as the Don River Naturalization and Portlands Flood Protection project, can generate significant data on water quality and ecosystem health of the Great Lakes, including nearshore areas. In addition, the Oak Ridges Moraine Groundwater Program (ORMGP) can provide a significant service in data retention for such projects. With respect to Result 2 (a), (surface water- groundwater conceptual and numerical models), the ORMGP could assist the Province with this Result in developing groundwater-surface water (GW/SW) models at various scales. The ORMGP has retained the modeling files for all the models produced by the nine conservation authorities located on the ORM and has undertaken a comparative analysis of the various models, especially where overlap of the model boundaries exists. The ORMGP is also working with its CA and municipal partners on a Terms of Reference with respect to future modeling projects.

	The Agreement's Result 2 goal for improved understanding of GW/SW interactions also ties into three different Science Need Areas as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report:* • Science Need Area 1: Advance assessment of regional-scale groundwater discharge (quantity) to surface water in the Basin • Science Need Area 5: Develop better tools for monitoring surveillance and local-scale assessment of groundwater-surface water interaction • Science Need Area 8: Develop scaled-up models of regional effects of groundwater on Great Lakes water quality. In particular, watershed planning exercises' future land and water use scenarios could be considered in the context of the model outputs generated by Source Protection Regions. With respect to Result 2 (b), (Undertake and promote monitoring and research to improve understanding of groundwater), this goal ties into Science Need Area 4 "Advance research on local-scale assessment of interaction between groundwater and surface water" as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report*. Conservation Authorities could aid the Province in its goal of improving understanding of groundwater influences on ecosystem health through local knowledge. TRCA recently undertook an exercise in identifying Ecologically Significant Groundwater Recharge Areas using outputs from groundwater models that were produced by the Source Protection Region. The model outputs were verified by undertaking statistical analysis of known groundwater dependent ecosystems captured by the model outputs. With respect to (c) (provincial groundwater, surface water and integrated climate change monitoring), this goal ties into Science Need Area 3 "Advance monitoring and surveillance of groundwater quality in the Great Lakes Basin" as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report*. Conservation authorities, with sufficient funding, can aid the Province through identifying priority watersheds in which to focus research efforts, compiling historical groundwater quality data, and increasing availability of hydrogeological mapping products. With respect to Result 3 (a) (Facilitate the coordination, sharing and exchange of information and research), this goal aligns with Science Need Area 6 "Advance research on the role of groundwater in aquatic habitats in the Great Lakes Basin" as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report*. As groundwater-dependent ecosystems are mapped within the Great Lakes Basin, conservation authorities can support the Province in collecting local data such as

	habitat patch and species distribution as well as assess their exposure and sensitivity to groundwater variation and other stressors. For Result 3 (b) (Identify priority sites or areas where point sources may impact...), this goal relates to Science Need Area 2 "Establish science-based priorities to advance the assessment of the geographic distribution of known and potential sources of groundwater contaminants relevant to Great Lakes water quality, and the efficacy of mitigation efforts" as identified in the *Groundwater Science Relevant to the Great Lakes Water Quality Agreement: A Status Report*.
Annex 10: Climate Change Impact and Resilience	TRCA and the Ontario Climate Consortium (OCC) are established, credible partners that can offer strategic planning support to many of the commitments made in the Climate Change Impact and Resilience Annex. TRCA serves as the Secretariat for the OCC. OCC brings together researchers from some of Ontario's leading academic institutions, as well as municipalities, conservation authorities, and the broader public sector. TRCA/OCC also collaborates with GLISA – Great Lakes Integrated Science Assessment Program - based out of the University of Michigan; GLIS is a leading group on climate modelling in the Great Lakes Basin and communicates climate change impacts to the broader community. TRCA/OCC has been supporting the Climate Change Annex (previously Annex 9 – Climate Change Impacts) in identifying climate science knowledge gaps and convening experts around climate modeling and information at the Great Lakes Basin scale. OCC also sits on the Extended Subcommittee for the Climate Change Annex and contributes to the development of the Great Lakes Annual Climate Summary. OCC Projects with the public sector include conducting vulnerability assessments in the Great Lakes Basin and hosting an annual climate science and planning workshop. OCC also provides climate change-related support to Annex 7, Habitat and Species, by convening stakeholders to discuss Resilience Thinking and climate change vulnerability assessment best practices associated with coastal wetlands. TRCA/OCC looks forward to continuing to support the objectives of the Agreement in tackling climate change into 2020 and beyond. We offer the following comments and questions on the draft new Agreement Annex 10 for climate change. Second paragraph - suggest revising sentence to "warmer water temperatures" and adding "increasingly variable waves and winds, extreme weather events."

	Third paragraph - The impacts of climate change will also have a significant effect on communities in the Great Lakes Basin. For example, harsh lake-effect snow and ice storms can disrupt critical services and damage infrastructure. Therefore, the third paragraph should also include how climate change impacts will affect communities. Further to the above, we suggest rephrasing sentence to "Regional adaptation planning, decision-making and action are supported through this program with the aim of helping communities and industries prepare for and adapt to local climate impacts ~~resulting from a changing climate~~ **including** the increase in droughts, floods and coastal erosion." TRCA also suggests adding problems with water and air quality, forest fires, crop changes, extreme weather events, and health impacts, to the list of local impacts. Suggest providing more details around the climate projections Ontario intends on using. For example, will Ontario use the data provided by the Canadian Centre for Climate Services? Or will the Province be undertaking its own regional climate modeling? It may be helpful to outline this here, since there are many uncertainties and gaps around climate modeling, specifically in the Great Lakes Basin (e.g., many climate models do not account for the Great Lakes). It would be helpful for the COA to provide more details on the on-line tool that the Province will be developing. For example, will this be similar to that of the Canadian Centre for Climate Services? Will the Province be running this tool, or will there be a provincial climate "hub" organization that will be leading this? Suggests adding "and with other Annexes of the GLWQA and enhancing inter-Annex collaboration and communication on climate change" in the last paragraph, when talking about sharing climate change information with the Great Lakes community. For Result 1, (Enhance knowledge and understanding of existing and future climate change impacts…), in (c), suggest adding "Great Lakes water levels" as Environment and Climate Change Canada is already doing this. For (j), is there a reason why this action only involves Lake Ontario? Suggest including all Great Lakes in Ontario, if possible. In Result 2, (Assess existing and future climate change risks and vulnerabilities…), suggest moving subsection d) "Share information and results from the Provincial Climate Change Impact Assessment and the Canada in a Changing Climate series of reports" to Result 3, as this is more focused around sharing information on climate

	change impacts, risks and vulnerabilities with the Great Lakes community. Under subsection g), revise "flood mapping" to "floodplain mapping". Result 3, (Share information on climate change impacts, risks and vulnerabilities....and advance the integration of climate change considerations...), in section (a), include other Annexes of the COA in the knowledge sharing, as there is a lack of inter-annex communication on climate change.

Attachment 2 – TRCA Response to COA Review