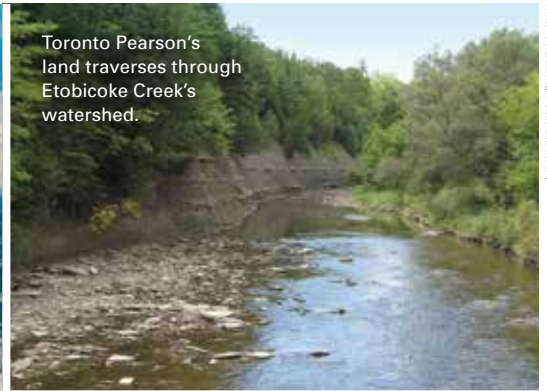




An aerial view of Pearson airport.



Toronto Pearson's land traverses through Etobicoke Creek's watershed.



The mouth of the Mimico Creek.

Conservation Authorities

A much needed model in today's climate. BY CHANDRA SHARMA

ON AUGUST 8, 2019, the Intergovernmental Panel on Climate Change (IPCC) published its special report on climate change and land. The report warns of “unprecedented” rates of land and freshwater degradation in recent decades due to rising temperatures. The various climate models used to develop the report are in general agreement that annual average air temperatures in Ontario may rise by two to five degrees Celsius by the end of the century. This will lead to changes in evaporation rates, severity of storms, and droughts resulting in significant alterations within the natural ecosystem of our watersheds. These changes may impact everything from species diversity to habitat health to human communities.

As a result of these changes and impacts, decades of floodplain management work, the adaptive watershed management approach, and the local expertise of conservation authorities (CA) in Ontario is being put to test. Conservation authorities are tasked

with the administration of watershed management programs such as:

- The collection, analysis, and modelling of local climate and water data.
- Flood and erosion management.
- Source water protection.
- Stormwater management (including natural green infrastructure and low impact development).

In many cases, this work has resulted in unique grassroots approaches to building resiliency of Ontario's rivers, lakes, and greenspaces.

The role of conservation authorities in Ontario

Approximately 95 per cent of Ontario's population, that's about 13 million people, lives in a watershed managed by one of 36 CAs.

CAs play an important role in determining how land in these watersheds is developed and used since they are a public commenting body under

the *Planning Act* and *Environmental Assessment Act*. They also issue permits under the *Conservation Authorities Act* to ensure that natural heritage will not be negatively impacted by development. In addition to this, CAs regulate flood plains to protect people and property from hazards including flooding. This critical role is strengthened by the fact that CAs own and manage approximately \$3.8 billion worth of flood control and prevention infrastructure, including 900 flood and erosion control structures (e.g., dams, dikes, channels, etc.).

This model of informing land use and infrastructure planning in Ontario is unique in that it is supported financially by public agencies. The model is also supported from a governance perspective since it is grounded in legislation including the *Planning Act* and its regulations, the *Conservation Authorities Act*, and parent class environmental assessments under the *Environmental Assessment Act*.

Another factor that contributes to

the success of the watershed planning model is the power of CAs to leverage government, agency, private sector, and community stakeholders. This collaboration is an absolute must to address the emerging environmental issues, such as urbanization and climate change, of our generation.

So how did we get here?

The success of Ontario's CAs can be traced back to the 1941 Guelph Conference where local conservation visionaries met to address natural resource conservation challenges of the day. At the time, soil loss, erosion, sedimentation, and flooding were associated with unsustainable agricultural and forestry practices and unrestricted floodplain development. This grassroots movement called for agencies that could have a coordinating and integrating role to promote conservation with the objective of formulating a unified program for the rehabilitation and wise use of all our renewable natural resources.

This conference and evolving government recommendations led to the passing of the *Conservation Authorities Act* in 1946. Hurricane Hazel led to further enhancement of the regulatory responsibilities of CAs. As CAs evolved over the decades, the adaptive (watershed) management approach served them well and enabled them to evolve in order to meet the needs of Ontario's environmental and land use challenges.

Watershed-based planning enables collaborative decision-making involving all levels of government and community. The benefits provided by CA watershed management programs have been successfully leveraged across the province to achieve many federal and provincial policy objectives around water management, climate change, the Great Lakes, protection of biodiversity, source water protection, sustainable agriculture, and urban growth.

How conservation authorities are dealing with land use and climate change

Increasing urbanization combined with extreme weather presents its own unique challenges and opportunities

for conservation authorities, such as the Toronto and Region Conservation Authority (TRCA), that are managing watersheds in the urban areas. A key challenge of the future is to protect and restore the natural resources and protect communities with aging infrastructure while trying to sustainably accommodate growth and prosperity.

While these challenges exist, there are signs that new, transformative solutions are being used at the local scale, including:

- Protecting and restoring water resources and biodiversity in a landscape that is subject to development and redevelopment pressures.
- Community design that integrates land use, built form, transportation, energy, and green infrastructure systems including flood protection measures.
- Achieving food security through sustainable local agriculture (land use, built form, and transportation).

Over the past two decades, innovative programs and partnership opportunities have emerged to integrate climate change, sustainability, and the green economy into activities that will increase biodiversity while providing good protection and recreation opportunities. These initiatives augment watershed programs and help prepare for the next generation of CA activities.

An example of this is a project that is currently underway at the mouth of the Don River with support from all levels of government and agencies. The project aims to remove the risk of flooding to over 240 hectares of urban land by engineering the river's course and creating naturalized features at the mouth of the Don River. This transformative project is a direct manifestation of the recognition by federal, provincial, and municipal partners that sustainable, resilient watersheds are catalysts in urban growth and redevelopment.

In addition to several flood mitigation projects similar to Don mouth naturalization, urban CAs have also launched several market transformation programs such as Partners in Project Green: A Pearson Eco-business Zone

(PPG), the Sustainable Technologies Evaluation Program (STEP), Sustainable Neighbourhood Retrofits (SNAP), and the Ontario Climate Consortium (OCC). Designed to address climate change and urbanization issues at different geographical scales and sectors, these programs deliver multiple objectives to achieve watershed sustainability.

Partners in Project Green: A Pearson Eco-Business Zone

Toronto Pearson, the largest landholder within the most urbanized watersheds of TRCA's jurisdiction, is surrounded by approximately 12,000 hectares of industrial, commercial, and institutional (ICI) lands.

TRCA's partnership with Toronto Pearson began with a mutual understanding and a drive to restore, protect, and enhance the Etobicoke Creek and Mimico Creek watersheds traversing through Toronto Pearson's lands. Soon, both entities realized that although they had improved Toronto Pearson's watershed, it would make little difference if those upstream and downstream didn't invest in similar improvements.

In 2007, Toronto Pearson made a commitment to work with local businesses in transforming the lands surrounding Toronto Pearson into an internationally recognized eco-business zone. To turn this vision into reality, Toronto Pearson worked with TRCA, the Region of Peel, City of Toronto, City of Mississauga, and City of Brampton to develop a program called Partners in Project Green: A Pearson Eco-Business Zone (PPG).

The program's jurisdiction covers an area that includes 12,500 companies that employ over 350,000 people. It works directly with companies to find efficiencies in water and energy use, as well as waste management.

Using a peer-to-peer learning model, collective projects, and on-site demonstrations/adoption of technologies, PPG is building a community of sustainability leaders. Calstone Inc. is one of these leaders that extended its commitment to sustainability by installing innovative low impact development (LID) stormwater management infrastructure on its property.

A view of the Don Watershed.



PPG helped the company create a new greenspace surrounding its office, which is located in the Highland Creek watershed, for employees by renovating an underutilized space setting. The new greenspace incorporates a stormwater management system that's designed to capture 100 per cent of the rainwater from Calstone's 3,900 square metre roof. This diverts approximately 0.8 million litres of rainwater annually from the municipal storm sewer and helps maintain a more natural water flow to Highland Creek.

Sustainable Technologies Evaluation Program (STEP)

The Sustainable Technologies Evaluation Program (STEP) is a multi-agency initiative developed to support broader implementation of sustainable technologies and practices within a Canadian context. Managed in partnership with TRCA, Credit Valley Conservation, and Lake Simcoe Region Conservation Authority, STEP WATER focuses on green infrastructure and LID, erosion and sediment control, healthy soils, preservation of natural features, and road salt management.

An Archetype House (bit.ly/ArchetypeSustainableHouse) located at the Kortright Centre in Vaughan was designed to educate and motivate the public and building industry professionals to move beyond these obstacles and to adopt greener building practices. The site includes LID

features such as rainwater harvesting, downspout disconnection, permeable pavement, bioretention, and a green roof.

Since its inception, this initiative has actively engaged the industry in some of leading edge technology transformation projects including:

Evaluation of Permeable Pavements:

STEP first evaluated permeable pavements in 2005 at Seneca College's King campus by examining soil and water quality, year-round stormwater management performance, and the effects of infiltration on groundwater quality. In 2008, a second Living Lab was constructed at the Kortright Centre for Conservation in Vaughan, Ontario. This long-term project evaluated and compared different permeable pavements relative to a conventional asphalt surface. Research topics included performance on tight soils, winter effectiveness, changes in infiltration capacity over time, long term performance, and the effectiveness of pavement cleaning techniques.

Bioretention Studies:

STEP has conducted several bioretention studies involving both new and retrofit installations to evaluate both proprietary and generic types. Key research topics to date have included pollutant removal and runoff reduction capacity, winter performance, road salt impacts, durability, maintenance needs, long term performance, cost-effectiveness, and phosphorus removal techniques.

LID Treatment Trains: With the widespread implementation of LID stormwater management practices, more sites are being designed to include LID treatment trains (TT). The TT approach involves the application of lot level, conveyance, and end-of pipe practices, often in series. TTs help maximize a site's capacity to achieve LID water management objectives, including maintaining the hydrologic cycle, protecting water quality, and preventing erosion and flooding. STEP is currently carrying out a monitoring evaluation of a multi-LID site—Mosaik Homes Glenway Subdivision in Newmarket - to assess the individual and combined effectiveness of the LIDs and their financial and technical feasibility from a construction and maintenance perspective. The project is one of the first in Ontario to demonstrate and evaluate widespread application of LID on the scale of a medium density residential subdivision.

The importance of CAs in today's climate

Much like the original natural resource management challenges CAs were formed to help solve, many aspects of future climate change and sustainability challenges need to be addressed locally but at scales that often transcend municipal boundaries. Ontario's CAs are well positioned to serve Ontario well in this regard. The importance of a governance structure that facilitates an integrated approach in dealing with climate change is emphasized in the IPCC's various assessment reports. This well-established model of bridging federal and provincial interest with municipalities objectives and local action presents an excellent approach to help address future challenges in Ontario and across Canada. **wc**

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