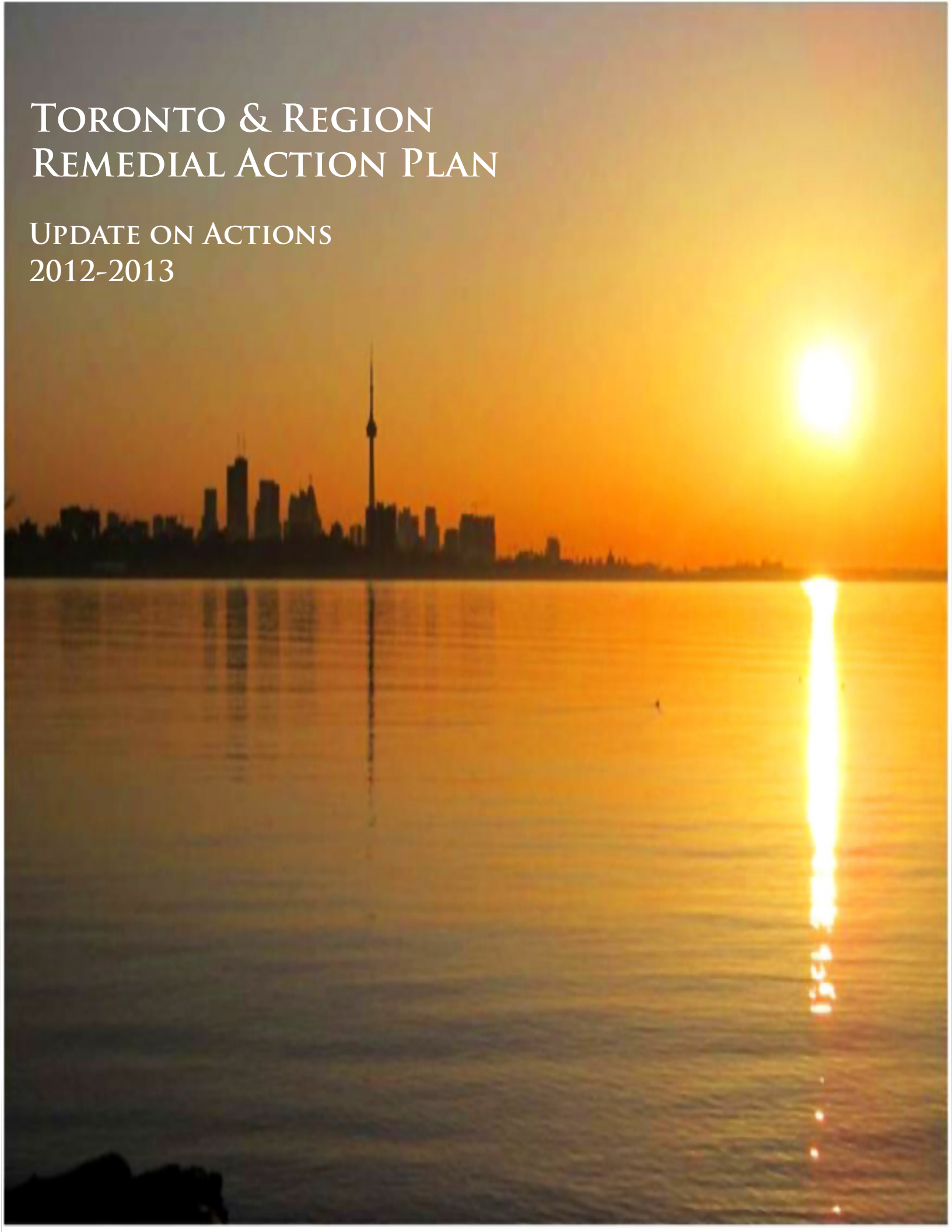


Toronto & Region Remedial Action Plan

Update on Actions 2012-2013

For additional copies of this report please contact:

TORONTO AND REGION CONSERVATION AUTHORITY
5 Shoreham Drive,
Toronto, Ontario, M3N 1S4

phone: 416-661-6600
fax: 416-661-6898

The Toronto and Region Remedial Action Plan is managed by representatives from Environment Canada, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources and Toronto and Region Conservation Authority.

Table of Contents

Background and Communications

Toronto and Region is one of 43 locations on the Great Lakes which were identified as suffering from degraded environmental conditions. These locations are referred to as Areas of Concern, and each Area of Concern is required to implement a Remedial Action Plan to address environmental issues. Currently 5 of the 43 Areas of Concern have successfully completed their Remedial Action Plans.

The Toronto and Region Area of Concern consists of six watersheds encompassing 2000 km^2 of land and 43 km of waterfront, and its Remedial Action Plan (RAP) is currently in the implementation stage. During implementation, remedial actions are undertaken and environmental progress is measured. The *Toronto and Region Remedial Action Plan: Update on Actions 2012-2013* reports on research and implementation projects that, as of 2012-2013, joined the roster of programs and projects that receive RAP support.

Descriptions of ongoing or recently completed projects that were in receipt of RAP support can also be found online in the documents *Toronto and Region Remedial Action Plan: Update on Actions 2007-2010, Toronto & Region Remedial Action Plan: Update on Actions 2010-2011 and Toronto & Region Remedial Action Plan Update on Actions: 2011-2012 at www.torontorap.ca*.

Projects outlined in this document that received RAP support in 2012-2013 address efforts to improve water quality, promote sustainable landuse practices, improve habitat quality and assess fish and wildlife populations.

For additional information on new or ongoing RAP projects contact your local RAP Coordinator at:

Toronto and Region RAP Project Manager
5 Shoreham Drive
Downsview, ON
M3N 1S4
Email: mstjohn@trca.on.ca

Beneficial Use Impairment Reports

A "Beneficial Use Impairment" (BUI) is a term that describes the environmental issues around which the Remedial Action Plan is structured. Beneficial Uses are human or ecological uses or qualities of the ecosystem, and these uses are considered "Impaired" when the Beneficial Use has been lost or damaged as the result of poor environmental quality.

In 2012-2013, the Toronto and Region RAP completed the evaluation of two Beneficial Uses previously deemed as impaired. The results of research assessing the Beneficial Use Impairments *Degradation of Benthos* and R*estrictions on Dredging Activities* identified that these Beneficial Use Impairments can be considered Not Impaired.

Concentrations of various metals and organic contaminants in sediment are generally below acceptable guidelines and the benthic community has demonstrated improvements. Dredged material in the Toronto and Region Area of Concern from the Keating Channel is disposed of in an existing confined disposal facility and there are no other foreseeable dredging activities within the remainder of the Area of Concern.

Remaining Beneficial Use Impairments in the Toronto and Region Area of Concern:

- *Restrictions on fish and wildlife consumption*
- *Degradation of fish and wildlife populations*
- *Eutrophication or undesirable algae*
- *Beach closings*
- *Degradation of aesthetics*
- *Loss of fish and wildlife habitat*

Remaining Beneficial Use Impairments that Require Further Assessment:

- *Degradation of phyto- and zooplankton populations*

RAP Aesthetics Update

Degradation of aesthetics is one of 11 Beneficial Use Impairments that was identified as impaired within the Toronto Area of Concern in 1989. The aesthetics concern related mainly to debris and litter along watercourses, weed growth along the western shoreline and turbidity near river mouths.

The aesthetics BUI is challenging to assess in a quantifiable manner. In 2012 an aesthetics monitoring program was conducted in conjunction with the Toronto and Region Conservation Authorities regular field monitoring as part of the Regional Watershed Monitoring Program.

Over 903 aesthetics samples were collected within the RAP study area and in the four watersheds to the east. An Aesthetics Quality Index (AQI) was used to determine the aesthetic quality of each site taking into account debris, odour, colour and clarity.

The study is set to continue in 2013-2014 and 2014-2015 focusing on different RAP watersheds. The results from this study will provide recommendations on whether aesthetics can be removed from the list of Toronto and Region RAP BUI's.

Lake Ontario Evenings

Since its 2009 launch, the Lake Ontario Evening Speaker Series has been a resounding success. These events have brought together diverse, standing-room only crowds to learn from, and share ideas with, the individuals and organizations working at the forefront of environmental challenges in Toronto and Region, Lake Ontario, and the Great Lakes as a whole.

The Lake Ontario Evenings event themes have included:

- Great Lakes Water Diversions (2009)
- Biodiversity (2010)
- The Lake Ontario Nearshore (2010)
- Environmental Contaminants (2010)
- Geology, Landscape, and Water (2011)
- Beach Water Quality (2011)
- Toronto Fish and Fish Habitat (2011)
- Drinking Water Source Protection (2012)
- The Urban Angling (2012)
- Tommy Thompson Park (2012)
- Food Webs (2013)

The Remedial Action Plan team has committed to continuing the Lake Ontario Evening Speaker Series through 2013-2014. Keep an eye on the Remedial Action Plan website for event listings and details.

www.torontorap.ca

Clean Waters

Polymer Application Guide, Training and Pond Dredging Pilot

Much of Toronto and Region Area of Concern is, or has become, a hardened landscape in which underlying soils have been covered by networks of buildings, sidewalks, parking lots, and roads. When rain falls, these hard surfaces are significantly less effective at absorbing water then natural surfaces they replaced. As a result, water collects and drains along the top of these surfaces - picking up contaminants such as oil, metals, and animal droppings en-route before being diverted into sewers and conveyed to a nearby river or Lake Ontario. The addition of this dirtied rainwater, referred to as stormwater, degrades the environmental quality of the water body into which it is recieved.

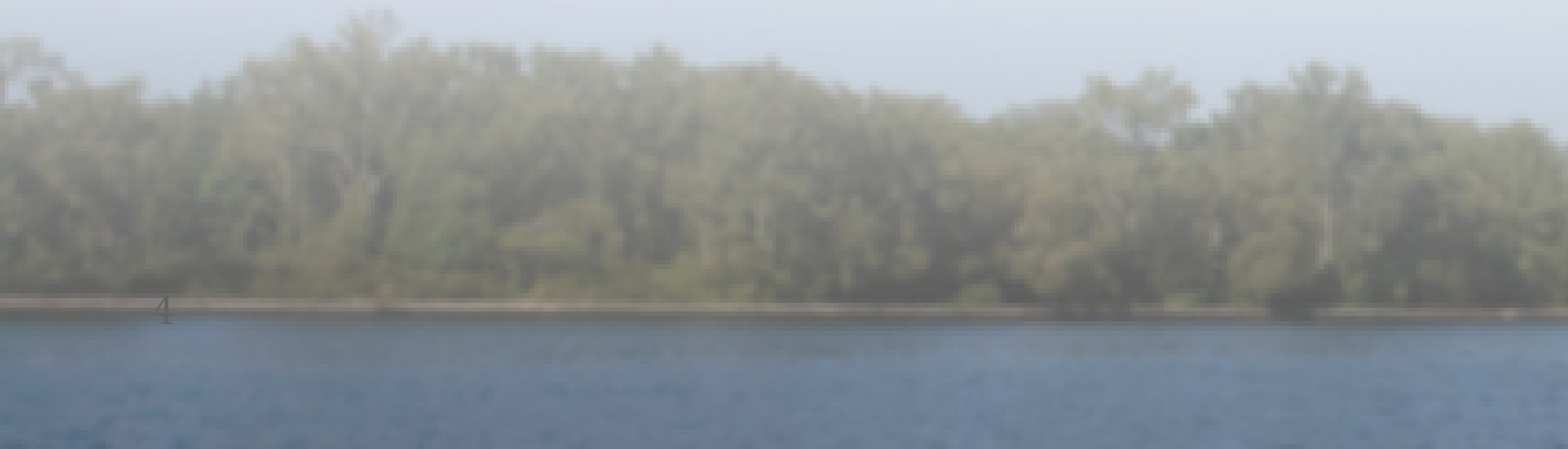
Within the Toronto and Region Conservation area there are more than 650 stormwater management ponds in operation. Stormwater ponds are used to collect and retain stormwater reducing the risk of flooding and allowing for the settling of contaminants and sediments.

Stormwater ponds must be maintained to remain effective. Traditionally, stormwater pond maintenance is a lengthy costly and disruptive process that involves drawing down the water in the pond, complicated pumping and bypass operations followed by weeks/months of excavation.

For several years polymer based technologies have been marketed as an effective means of managing sediment on construction sites. The effectiveness of polymers lies in their ability to enhance coagulation and/or flocculation of fine suspended and sediment particles.

In 2012-2013 the RAP supported the evaluation of the performance of polymer technology. The project included a review of previous field applications using polymer technology, laboratory testing of 70 liters of slurry samples from a stormwater pond in Vaughan and the development of a polymer training course available for download at the sustainable technologies evaluation program (STEP) website (www.sustainabletechnologies.ca).

The initial study determined that the most significant benefit of polymer treatment was the ability to consolidate or thicken saturated soils that would otherwise be difficult to remove. This would reduce cleanout costs significantly. Also the use of hydraulic dredge technology in combination with polymer injection can reduce environmental impacts, reduce disturbances to nearby residents and reduce off-site impacts.



Sustainable Watersheds

Water Garden Project

The goal of the Water Garden Project was to reduce the impacts of stormwater runoff in residential neighborhouds. Hardened surfaces interfere with the natural water cycle and can contribute to degraded water quality.

The project was introduced into the Valleybrook community of Brampton, Ontario as a pilot project. The most popular stormwater management projects that people were interested in were rain barrels, rain gardens, soakaways and infiltration trenches.

Stormwater management both large and small scale can support improved environmental sustainability by:

- Avoiding the creation of polluted stormwater
- Reducing impacts on lakes, rivers and watersheds
- Reducing the risks of urban flooding and erosion
- Reducing the risk of damage to private property

For more information on how to green your home and stormwater management options please visit the Sustainable Neighbourhood Retrofit Action Plan (SNAP) and Sustainable Technologies Evaluation Program (STEP) websites at:

http://sustainableneighbourhoods.ca

www.sustainabletechnologies.ca

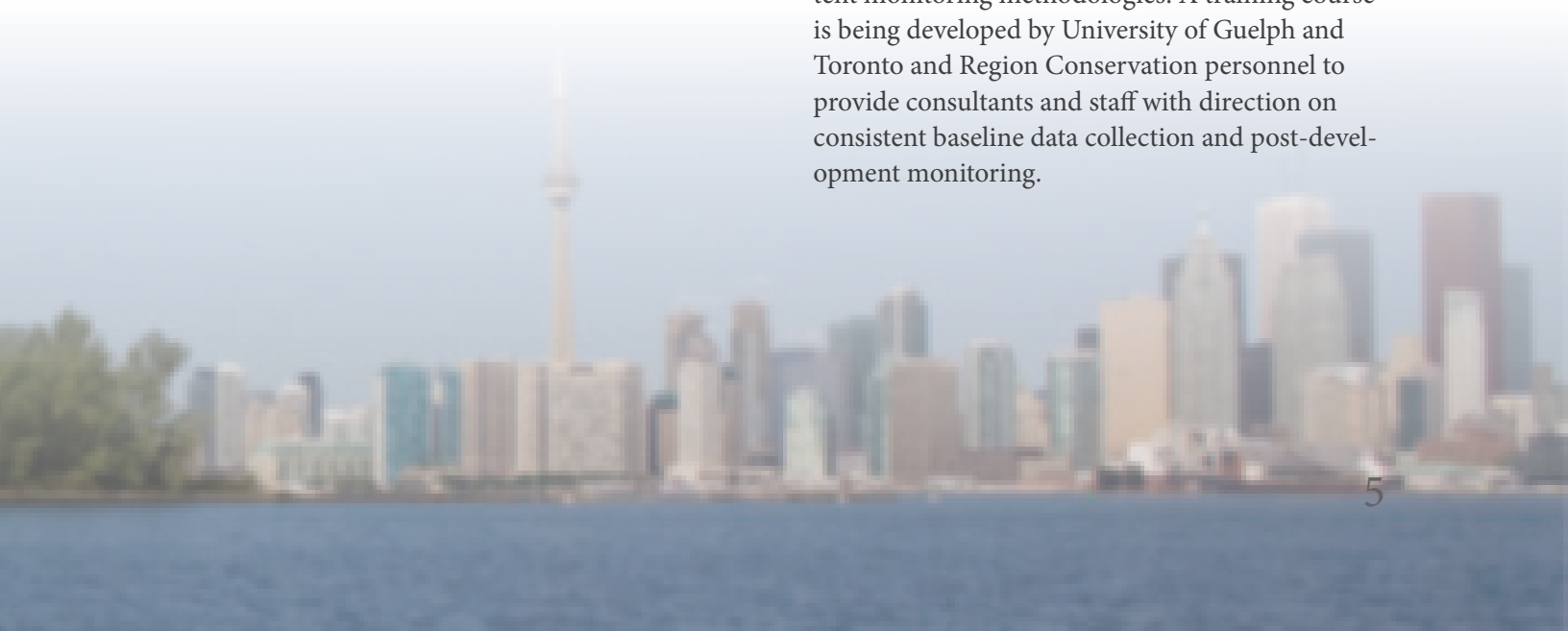
Developing Stormwater Water Balance Criteria for the Protection of Natural Features in an Urban Setting

This project provides the scientific support required for the refinement of guidelines outlining water balance criteria and monitoring methodologies to ensure the long-term protection of natural features (wetlands, woodlands and watercourses) through the urban development process.

Wetlands, woodlands and watercourses are integral components of the watersheds of the Toronto region and are often negatively affected by urban development. Impacts to these natural features can be linked to changes in hydrology including changes in water quantity, quality, volume, duration, frequency, and timing of flow.

This project conducted research to gather scientific information to support the refinements of guidelines outlining water balance criteria and monitoring methodologies. This research will advance knowledge and understanding of hydrological requirements of natural features to protect their long-term ecological health during urban development.

In 2013, instrumentation was installed at three wetlands and data is currently being logged. Research also indicated that a barrier to effective water balance monitoring was the lack of consistent monitoring methodologies. A training course is being developed by University of Guelph and Toronto and Region Conservation personnel to provide consultants and staff with direction on consistent baseline data collection and post-development monitoring.



Stewardship and Education

Watershed on Wheels

Watershed on Wheels (WOW) is a mobile environmental education classroom that engages over 20 000 elementary school students each year in programs related to water quality, water conservation, climate change, biodiversity, and other environmental issues. In 2012-2013 outreach initiatives included pollinator activities tours of the Humber River Watershed, tree planting, and wildlife hikes.

In addition to the learn to canoe and night hike campfire events, the program also supported 4 new Conservation Parks Education programs that inlcuded, learn to camp, trail running, Geocaching and mountain biking.

Youth and Community Greening of the Rouge River Watershed

In 2012 the Rouge River watershed initiative restored former agricultural lands by planting 30 ha of forest, wetland and meadow plants in Rouge Park. The project focuses on reforestation with native vegetation and the creation of wildlife habitat including log piles, raptor posts, bird boxes and vernal pools. In addition 1 476 m of riparian vegetation and over 12 582 wildflowers were planted. Improvements to water quality were also achieved with reductions of 870 and 90 kg of fertilizer and pesticide use within the region. The project was accomplished with the help of the community and over 3000 students from the Toronto District School Board.

Caledon Headwaters Rehabilitation Initiative

The goals of the Caledon Headwaters Rehabilitation Initiative are to protect and rehabilitate fisheries habitat within the many headwater tributaries of the Town of Caledon through in-stream habitat enhancement, mitigation of barriers to fish passage, riparian regeneration, fisheries monitoring, and Atlantic Salmon restoration. An additional objective of this initiative is to increase communication amongst individuals and organizations involved in conserving aquatic environments in Ontario and act as a catalyst to empower communities in conserving their local environment through partnership building and the provision of resources.

In 2011, 180 m of Coffey Creek was restored through the installation of structures that provide overhead cover for fish and habitat for other species while deflecting stormflows away from vulnerable stream banks. At Boyce Creek and Centreville Creek volunteers, under expert guidance, undertook invasive species removal.

In 2012, over 5000 native trees, shrubs and live stakes covering an area of 6728 m^2 were planted. Gabion baskets were removed along Albion Hills and the streambanks were stabilized and naturalized using rocks and native plantings. At Boyce Creek erosion protection was installed using woody material along the banks and a massive garbage cleanup effort was completed by volunteers along the Humber River. Using incubation tubes, over 197 000 Atlantic salmon eggs and fry were successfully stocked into the Humber River and its tributaries.

Healthy Habitats

Lower Humber Weir Project

A weir is a barrier across a river designed to alter its flow characteristics. In most cases, weirs take the form of obstructions smaller than most conventional dams, and function to provide channel stability, regulate flows and reduce bank erosion.

These barriers have a number of negative impacts on the watercourse and its ecology. Reduced stream velocity resulting from these barriers causes upstream ponding and sediment deposition, which in effect starves downstream reaches of natural bed load and increases water temperatures. Weirs can also have an effect on local fauna. While a weir is easy for some fish to jump over, other species or certain life stages of the same species may be blocked by weirs due to relatively slow swim speeds or behavioral characteristics.

The goal of the Lower Humber Weir project was to develop a mitigation strategy for up to 8 weirs on the lower Humber River that were impacting fish passage for both native jumping and non-jumping fish species. The weirs are located between Bloor Street and HWY 401 on the Humber River.

This is a two phase project. The first phase consists of assessing structural condition of weirs, developing plans for erosion control and defining potential modifications that can be made to the weir to achieve fish passage. Options being looked at range from full to partial removal, to other mitigation options to provide fish access such as fishways or rocky ramps.

The second phase will focus on developing a long-term management strategy and implementation plan for proposed modifications, while considering the need for ongoing operation and maintenance of parkland and municipal infrastructure, maintaining public safety and exploring community access to provide connections across the Humber River.

Humber Marshes Wetland Restoration

This wetland restoration project restored 6.6 ha of wetland habitat in the Humber Marshes. The wetland habitat was restored by installing a water control structure and a carp gate. The water control structure helps to accelerate aquatic plant growth by allowing the ability to manipulate water levels as needed. The carp gate excludes Common Carp which are extremely damaging to aquatic plants. By excluding the Common Carp aquatic plants are able to grow and thereby create spawning, nursery and feeding habitat for Northern Pike, Largemouth Bass and Smallmouth Bass. Restoring the Humber Marshes is a step closer to helping delist Toronto as a RAP site.

Toronto Island Wetland Implementation

This project created a 1.0 ha wetland complex on the Toronto Islands as part of a multi-year initiative. This wetland complex works toward a delisting target of creating 75 ha of wetland habitat to help offset the historic loss of approximately 500 ha of wetland from Ashbridges Bay. The wetland complex includes sheltered embayments to encourage aquatic plant growth which creates spawning, nursery, and feeding habitat for Northern Pike and Largemouth Bass. In the spring of 2013, Northern Pike were seen spawning in the wetland. This project is now completed and is ready to operate as a 'fish habitat bank', a model which will allow habitat creation and restoration projects to continue in perpetuity.

Fish and Wildlife

Toronto Harbour Fish Assessment

The Toronto Harbour Fish Assessment project examines the year-round habitat needs of 230 tagged native and nonnative fish as they live, feed, reproduce, and overwinter in Toronto Harbour. By tagging fish and tracking their movements researchers are gaining insight on how created wetland habitats are benefiting desirable native fish species.

Results from the first three years of tracking show native fish are using the newly constructed Cell 1 Wetland at Tommy Thompson Park during all seasons. Tagged fish will continue to be monitored this summer throughout the Harbour.

Humber Marshes Wetland Restoration

This wetland restoration project restored 6.6 ha of wetland habitat in the Humber Marshes. The wetland habitat was restored by installing a water control structure and a carp gate. The water control structure helps to accelerate aquatic plant growth by allowing the ability to manipulate water levels as needed. The carp gate excludes Common Carp which are extremely damaging to aquatic plants. By excluding the Common Carp aquatic plants are able to grow and thereby create spawning, nursery and feeding habitat for Northern Pike, Largemouth Bass and Smallmouth Bass. Restoring the Humber Marshes is a step closer to helping delist Toronto as a RAP site.

Toronto and Harbour Substrate and Shoreline Survey Report

Shorelines are some of the most ecologically productive habitats and support a diverse population of plants and wildlife. Because of this productivity shorelines provide excellent angling opportunities.

Unfortunately, many shorelines, particularly in urban centers like Toronto have been altered in some way. In 2012, a substrate and shoreline survey was conducted along the Toronto waterfront to help guide Aquatic Habitat Toronto in their habitat restoration and creation efforts.

The surveys were completed using aerial imagery and field teams to identify the different types of shorelines within the study area (i.e. boulder, rip rap, vertical walls, public beaches). Currently 83% of the shoreline area has been classified. The remaining 15% will be targeted in 2013.

The surveys will help create a GIS layer that is required to complete detailed habitat evaluations and assessments; thus ensuring RAP habitat goals are effectively being met.

Terrestrial Fixed Monitoring Plots

The Toronto and Region Conservation Authority (TRCA) conducts a long-term regional Watershed Monitoring Program that is designed to assess the health of the region's watersheds and natural heritage features. Under this program fish, geomorphology, water quality and benthic invertebrates are being assessed annually. In 2008, this program was augmented with the addition of a number of terrestrial long-term fixed plots within three land-use types; urban, urbanizing and rural.

The purpose of these plots is to detect spatial and temporal trends in the vegetation, breeding bird, amphibian and salamander communities within the TRCA jurisdiction.

As the purpose of monitoring is to detect change, several years of data (at least five) is required in order to have a dataset that is large enough to conduct analysis and to start identifying trends. The longer term goal of the monitoring project is to have a large enough sample size in order to not only detect trends across the jurisdiction but also to be able to compare results between three land-use types.

Collectively, these programs seek to improve overall terrestrial biodiversity wihtin the Area of Concern and advance RAP objectives related to habitat quality.

Greater Toronto and Area Waterfront: An Urban Recreation Fisheries Plan

Fish are known indicators of environmental health; if the physical condition of a lake or river declines, the diversity and productivity of fish populations also decline. The protection and management of fisheries and other aquatic resources has been instilled in organizations at the local, regional and provincial scales.

The Ministry of Natural Resources, Credit Valley Conservation, Central Lake Ontario Conservation Authority and Toronto and Region Conservation have initiated the preparation of a Recreational Fisheries Plan along the Lake Ontario waterfront from the western border of the City of Missisauga to the eastern border of Durham.

Through a consulative process with a number of partners the objectives of the Plan are to:

- Identify the state and health of the fish communi ties and provide guidance for recreational fishing
- Identify waterfront areas where recreational fishing can be promoted
- Identify areas where recreational fisheries can be im proved through opening access and/or aquatic habitat rehabilitation
- Work with local tourism and recreation stakeholders in promoting urban fishing and awareness
- Increase the number of licensed anglers within the Greater Toronto Area
- Promote Lake Ontario, fishing and the benefits of restoring and protecting habitat

www.torontorap.ca