TORONTO & REGION REMEDIAL ACTION PLAN

UPDATE ON ACTIONS 2007-2010



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TABLE OF CONTENTS

- Introduction 4
- Clean Waters 6
- Healthy Habitats 8
 - Fish & Wildlife 9
- Sustainable Watersheds 10
- Education & Stewardship 12
 - Administration 14



INTRODUCTION

Toronto & Region Remedial Action Plan

Toronto & Region is one of 39 locations around the Great Lakes where local environmental degradation may be causing harm to the wider Great Lakes system. These locations, referred to as Areas of Concern (AOCs), were formally recognized by the governments of Canada and the United States in the *Great Lakes Water Quality Agreement* (GL-WQA) amendments of 1987 (GLWQA Annex 2).

The Toronto & Region Area of Concern consists of six watersheds stretching from the Rouge River in the east to Etobicoke Creek in the west. This area encompasses 2000 km² of land, 42 km of water-front, eleven municipal jurisdictions, and over four million residents.

The Remedial Action Plan (RAP) is the mandated process through which environmental issues are addressed in an Area of Concern. An individualized RAP is required for each Area of Concern, and an Area of Concern cannot be considered remediated until all stages of the RAP have been completed and documented.

The Toronto & Region RAP is currently in the implementation stage, in which recommended actions are being completed and environmental progress measured. This report provides an update on implementation projects supported by the RAP between 2007 and 2010.

What is the current status of the Toronto & Region Area of Concern?

The status of an Area of Concern is determined by assessing the state of local environmental conditions against fourteen different Beneficial Use Impairments (BUIs). Each BUI describes a human or ecological use of the ecosystem that has been reduced, or impaired, as the result of environmental degradation.

The current status of each of the Beneficial Use Impairments in the Toronto & Region Area of Concern is listed below. A more detailed description of this summary can be found in *Moving Forward*, the 2007 Toronto & Region RAP Progress Report.

Impaired in Toronto & Region

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

Not Impaired in Toronto & Region

- Tainting of fish and wildlife flavour
- Restrictions on drinking water consumption, or taste or odour problems
- Added costs to agriculture or industry

Requires Further Assessment

- Bird or animal deformities or reproduction problems
- Fish tumours or other deformities
- Degradation of phyto- and zooplankton populations

Looking Ahead from 25 Years of RAP

Although the current RAP process received its mandate from the 1987 amendments to the *Great Lakes Water Quality Agreement*, it is important to note that 2010 marks the 25th Anniversary of the RAP in Toronto. In the autumn of 1985, the Waterfront Remedial Action Plan (WRAP) committee was formed and subsequently developed a series of recommendations for remediating the Toronto waterfront and harbour. These recommendations were an important starting point for the principles and goals of the current Remedial Action Plan.

In 2009-10, the Toronto & Region RAP initiated a review of the RAP Goals and Beneficial Use Impairment criteria - the benchmarks against which environmental conditions are compared. This review will examine the scientific foundations upon which the BUI criteria were established, and determine if updates are required to incorporate new information. Great care, including a comprehensive public and stakeholder involvement process, will be taken to ensure RAP goals and principles are honoured throughout this process.

Bay of C

ake Ontario

ABOUT THIS REPORT

This report provides a summary and update of Toronto and Region Conservation (TRCA) projects that received RAP funding between 2007 and 2010, as per agreements between the TRCA, Environment Canada and the Ontario Ministry of the Environment. As illustrated on pages 14-15, RAP funding provided an integral, although by no means solitary, source of support for these projects. It is therefore important to recognize, when reading the profiles in this report, that support from all levels of government, the non-profit sector, private foundations, academia, and private industry have been essential in advancing these projects and their outcomes.

Projects funded through the Remedial Action Plan are only a small fraction of the initiatives that have, and continue to, contribute to RAP objectives. Substantial efforts are being undertaken by municipalities within the Area of Concern - in particular the ongoing implementation of the City of Toronto's Wet Weather Flow Management Master Plan - to mitigate the effects of urbanization and stormwater on the environment. The many important contributions made by the academic community, non-governmental organizations, community groups, and individuals are not fully reflected in this update. Readers are therefore directed to Moving Forward, the 2007 RAP Progress Report, if they seek a more comprehensive overview of projects that are advancing RAP objectives.

CLEAN WATERS

Urbanization, and the associated increase in stormwater, is the foremost challenge faced by the Toronto & Region Area of Concern. The progressive hardening of surfaces, such as with roads and parking lots, increases the volumes of stormwater that can ultimately degrade local watercourses and the Lake Ontario shoreline. The following programs received RAP support to research and promote technologies that mitigate the effects of stormwater in urbanized and urbanizing environments.

Permeable Pavement

Permeable pavement allows for the ground to be hardened, such as might be needed for a parking lot or walkway, while still allowing rainwater to penetrate into the ground below.

Between 2007 and 2010, the RAP provided support to two notable permeable pavement research projects. In 2008, monitoring and assessment at the Seneca College - King Campus permeable pavement research site was completed. This research evaluated quality and quantity of stormwater runoff, infiltration rates, permeable pavement maintenance requirements, and the quality of soil beneath the permeable pavement. Similar measurements were collected for a bioretention swale at this same site.

In the same year (2008), development of a permeable pavement research facility at the Kortright Centre for Conservation also got underway. This facility will allow for comparative research on a range of permeable paving technologies under standardized conditions and in a soil type characteristic of Toronto & Region.

Rainwater Harvesting

Rainwater harvesting drains the rainwater on a roof or other hard surface into a container for storage and reuse. A familiar example at the residential scale is the rain barrel, however for larger volumes of water a cistern is used. Rainwater harvesting contributes to RAP objectives by reducing stormwater runoff while also increasing water conservation.

Between 2007 and 2009, three Toronto-based rainwater harvesting demonstration and monitoring projects received RAP support. These sites were situated across a range of land uses: one at a commercial facility, another at a high-rise residential complex, and a third at a public school. Continuous monitoring of cistern water levels, water overflows to the stormsewer, rainfall, and water use took place at each of these sites, and samples of cistern water were analyzed to characterize the quality of the non-potable water supply. A model was also developed based on monitored data to evaluate the effectiveness of the three systems during a 'normal' rainfall year and over a range of cistern sizes.

Stormwater Runoff Infiltration Tanks

Like rainwater harvesting, infiltration tanks collect rainwater runoff from hard surfaces. Infiltration tanks, however, are built into the ground and release collected waters into the soil below to reduce surface runoff and promote groundwater recharge.

Between 2008 and 2010, the RAP supported research to evaluate the effectiveness of three different variations of infiltration tank systems in different soil types. Continuous measurements of rainfall, water level, and infiltration rates were measured at all sites, as was water quality at sites where runoff water was treated prior to release.

Erosion and Sediment Control (ESC)

When rain falls on exposed soil, as happens where lands are being developed, the soil is vulnerable to being washed away and ending up in nearby watercourses; once in a watercourse, it may adversely affect water quality and aquatic habitat.

Between 2007 and 2010, the RAP provided support to a number of Erosion and Sediment Control (ESC) programs. These included research to ensure the existing guidelines are achieving their intended results, the evaluation of ESC practices, and the development and delivery of training materials to assist the professional community in correctly implementing ESC measures.

Green Parking Lots

Bridging the gap between technology development and accepted practice often requires early adopters to demonstrate how, and how well, a technology works. To encourage the adoption of the technologies discussed above, the RAP provided support to two green parking lot projects in 2010. In the first, support was provided to complete implementation of a green parking lot at a commercial site. In the second, landowner access to green parking lot design services will be enhanced through a collaborative program with the local post-graduate design students.

Research & Monitoring

The Region of Peel **Spill Decision Support System** is a novel tool that will allow spill response crews to know quickly and with certainty - the direction a spill is heading and the location from which it originated. By using GIS to digitally map the Peel sewer system, and then developing a web-based portal that shows how spills move through this system, responders can determine where to direct their responses to protect the surrounding environment.

Many of the identified programs that contribute to the Clean Waters objectives are undertaken by the Sustainable Technologies Evaluation Program (STEP). The STEP program takes a critical, rigorous approach to the evaluation of stormwater management technologies; an approach buttressed through frequent collaboration with researchers from academia, government, and industry. A more complete overview of STEP and their projects, as well as access to their reports on study findings, can be found at

www.sustainabletechnologies.ca.

HEALTHY HABITATS

Terrestrial Natural Heritage Program

One of the completed RAP priority actions is the development of a Natural Heritage Strategy to protect and restore terrestrial habitat within the Area of Concern. The *Terrestrial Natural Heritage System Strategy* was approved by the TRCA in 2007, and since that time the RAP has provided support to the development of tools and models to support its successful implementation. *http://www.trca.on.ca/protect/land/terrestrial-natural-heritage/*

Ecosystem Valuation and Compensation

An intact, healthy environment provides many benefits - such as clean air and water - that might otherwise take significant financial resources to produce. Between 2007 and 2010, the RAP provided support to improve our understanding of the value of these natural resources to Toronto & Region. Once completed, the ecosystem valuation process will provide a better understanding of the value inherent in existing natural system, the true cost when natural lands are lost, and the compensation required to offset these losses.

Ecosystem Recovery Planning

When planning habitat restoration, it is important to know what type of habitat is most needed, where it might be best implemented, and what plants and animals will benefit most. Between 2007 and 2010, the RAP provided support to the Ecosystem Recovery Planning initiative to help ensure the greatest possible environmental benefits from habitat restoration in Toronto & Region. An outcome of this work - the *Draft Recovery Planning Report* - was completed in 2010.

Terrestrial Invasive Plant Program

The Terrestrial Invasive Plant Program seeks to protect habitat by identifying and addressing areas where invasive plants may pose a significant risk to native plant survival. In 2008-2009, the RAP provided support to complete a review of the relevant literature, develop a working group of invasive plant experts, and to identify and map priority areas in need of attention.

Rouge Park Implementation

In 2008-09, RAP support was provided to the *Rouge Park Natural Heritage Action Plan.* This assistance contributed to the strategic planning of wetland, riparian, and reforestation opportunities in Rouge Park, as well as to the completion of the Reesor Road wetland, a 3.4 ha open water marsh. *www.rougepark.com*

Headwater Water Quality Assessment

Headwater streams, the small streams that appear in the spring or after a major rainfall, are poorly understood and therefore vulnerable to impacts from urban development. In 2008-09, the RAP provided support to the monitoring of these streams; these data will contribute to their protection through further refinement of the *Interim Headwater Guideline*. Prior to 2007, the RAP contributed to the restoration of fish habitats and populations through the development of **Toronto Waterfront Aquatic Habitat Restoration Strategy (TWAHRS)** - a strategy now implemented through the collaborative, multijurisdictional group **Aquatic Habitat Toronto (AHT)**. Remedial Action Plan support was provided to AHT initiatives discussed below to advance the understanding of Toronto fish communities and habitats.

A **Spatial Habitat Assessment** used GIS to map the TWAHRS habitat plan and, in doing so, plotted and quantified the restoration opportunities for different types of habitat across the Toronto waterfront. At a more specific level of detail, the **Determinants of Warmwater Fish Habitat Quality in Constructed Coastal Embayments** investigated the consequences of connecting constructed embayments - where water is warmer and more hospitable to many early life stages of fish - directly to the cooler Lake Ontario waters.

Habitat studies were complemented by a **Fish Community Analysis**, in which the existing and desired native fish communities in Toronto Harbour region were examined and this information is being used to garner insight about the necessary types of local aquatic habitat(s). In order that all appropriate Toronto fishes to be considered in habitat planning, a **Trawling and Acoustics Survey** was undertaken in September, 2009. This study gathered information about

FISH & WILDLIFE

fishes living in water between five and twenty metres deep, and was an important complement to the electrofishing data routinely collected in shallower waters. A report on the results of the electrofishing surveys, *The Fish Communities of the Toronto Waterfront: Summary and Assessment 1989-2005*, was published in 2008.

Studies to understand the response of fish to habitat restoration were also conducted. The fishes found at sites around Toronto Harbour were compared using **Multivariate Analysis**; these analyses provided information on increased fish community diversity related to habitat creation and restoration initiatives. In 2010, a **Fish Population Habitat Use Monitoring** project was also launched. In this study, the movement of individual fish in the Toronto Harbour will be tracked year-round, and the resulting data used to provide insight on how fish respond to habitat improvements, what habitats are important at different times of the year, and what habitats are used at different fish life stages.

Finally, a series of studies were undertaken using yardsticks for measuring improvements in habitat (the **Habitat Alteration Assessment Tool**) and fish communities (the **Index of Biotic Integrity**) for assessing impairments of fish habitat and population and comparing these regionally with other Areas of Concern.

www.aquatichabitat.ca



SUSTAINABLE WATERSHEDS

Watershed Plans & Strategies

The Toronto & Region Area of Concern includes six complete watersheds covering over 2000 square kilometres. For each of these watersheds, a Watershed Strategy has been developed to protect and restore the natural and built environments contained within their boundaries.

With the exception of restoration initiatives along the Toronto waterfront and those involving infrastructure, planning and implementation of restoration activities in the Area of Concern occurs at the watershed scale. Watershed Plans, with their solid foundations in science, planning, and public involvement, provide the blueprint for these restorative actions. The RAP therefore provides ongoing support for the development and implementation of Watershed Plans within the Toronto & Region Area of Concern.

Watershed Plans are continuously reviewed and updated to ensure the activities and land uses in the watershed are accurately reflected. The following updated watershed Plans were released between 2007 and 2010, :

- Pathways to a Healthy Humber: Humber River Watershed Plan & Implementation Guide (2008)
- Towards a Healthy and Sustainable Future: Rouge River Watershed Plan & Implementation Guide

http://www.trca.on.ca/protect/watersheds/

Watershed Coalitions

The development of watershed report cards and strategies, and the implementation of watershed plans, is guided through the multi-stakeholder forum of the Watershed Coalition. Watershed Coalitions are composed of a cross section of the local community, and include local politicians, representatives of governmental and non-governmental agencies, and interested members of the public.

Watersheds are the "action units" of the Remedial Action Plan - the level of organization around which many of the protection and restoration initiatives are developed and implemented. Accordingly, it is at this level that the RAP provides continuing support to public involvement and decision-making by providing support of the following Watershed Coalitions:

- Etobicoke-Mimico Watersheds Coalition
- Humber Watershed Alliance
- Don Watershed Regeneration Council

Through these groups, public communication about watershed health and restoration took place through the following publications:

- Listen to Your River: A Report Card on the Health of the Humber River Watershed (2007)
- Creek Time: The Etobicoke and Mimico Creeks Watersheds Newsletter
- On the Don: E-Newsletter

Fisheries Management Plans

Watershed-based Fisheries Management Plans (FMPs) provide important information about fish and fish habitats in the creeks and rivers of Toronto & Region. Fisheries Management Plans are provincial documents, and are the product of significant government cooperation and public involvement. The FMPs outline information such as the different species of fish that are living or have lived in a river, what types of habitat are found through the aquatic ecosystem, and the number and type of barriers (such as dams) that can prevent or limit fish passage. Watershedbased FMPs highlight management for Species at Risk, set the timing windows for construction to mitigate the impacts of in-water or near-water works and, most importantly, identify the challenges to healthy fish communities and provide recommendations for protecting and improving stream ecosystem health.

Between 2007 and 2010, the RAP provided support to the development and completion of several Fisheries Management Plans, including:

- Don River Fisheries Management Plan
- Rouge River Fisheries Management Plan
- Etobicoke Creek Fisheries Management Plan

The ongoing refinement and implementation of these plans will considerably improve the quality of fisheries and fish habitats within the Area of Concern.

http://www.trca.on.ca/protect/aquatic-habitat/ fisheries-management.dot

Research & Monitoring

Since 2002, the **Regional Watershed Monitoring Network** (RWMN) has applied a comprehensive and collaborative approach to monitoring the watersheds of the Toronto & Region Area of Concern. This initiative, which brings together several monitoring programs, fills an important coordinating function identified in the 2001 RAP Progress Report *Clean Waters*, *Healthy Habitats*.

The RWMN collects and analyzes the data on a range of indicators of watershed health - water quantity and quality, benthic communities, and aquatic and terrestrial habitats to name a few - from over a thousand locations within the Area of Concern. These data provide important information about environmental quality and conditions, are used to assess progress, and inform the issues and recommendations in the Watershed and Fisheries Management Plans.

Understanding the condition of the Area of Concern, and making sound sciencebased decisions to improve it, are central tenets of the RAP. The Remedial Action Plan has therefore provided ongoing support to the RWMN to collect the data needed to support these objectives.

http://www.trca.on.ca/protect/monitoring/regional-watershed-monitoringnetwork.dot

EDUCATION & STEWARDSHIP

Each day, the millions of residents living and working in the Greater Toronto Area make decisions and take actions that may help or harm the surrounding environment. Since its inception, the Toronto & Region RAP has recognized the importance of improving the capacity of the local community to understand and advance RAP objectives. To this end, the following programs received RAP support between 2007 and 2010 to provide education and stewardship opportunities within the Area of Concern.

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. The stream study program brings environmental learning and stewardship close to home for students by teaching them about the importance of benthic communities while visiting a local river or stream.

http://www.trca.on.ca/school-programs/facilitiesand-programs/watershed-on-wheels/

Yellow Fish Road

Developed by Trout Unlimited Canada, the Yellow Fish Road program is a half-day educational program that helps participants to understand the causes and effects of stormwater pollution. This community-oriented program also encourages residents to be part of the solution to nonpoint source pollution by providing information on the safe disposal of household hazardous waste and engaging participants in the marking of storm drains with bright yellow fish.

Aquatic Plants Program

The Aquatic Plants Program engages students in the restoration of wetland habitats by having them raise native aquatic plants in their classrooms. In the spring, students travel to a local wetland to transplant their plants and learn about the role of wetlands in improving water quality, providing habitat, and serving as important components in watershed and Great Lakes ecosystems.

Multicultural Environmental Stewardship Program

The Multicultural Environmental Stewardship Program builds an awareness of local environmental issues to new Canadians through engagement in hands-on restoration and environmental education activities.

Family Nature Events

Family Nature Events engage local residents in educational seminars about local environmental topics such as nocturnal wildlife, friendly fishing, ornithology, and nature photography. These events, offered free to the public and held several times a year, provide residents with information about environmental attractions in their local area while also providing resources to improve the understanding and protection of these features.

Don-Highland Stewardship

The Don-Highland Community Stewardship program works to protect and restore water quality and wildlife habitat throughout the Toronto Waterfront area and in the Don River and Highland Creek watersheds. With the help of committed volunteers, this program improves the health of these watersheds through hands-on community events and educational workshops. Activities include the planting of native trees and shrubs and creation of wildlife habitat, nature interpretation and wildlife monitoring, bird and butterfly festivals, and an annual Community Stewardship Forum.

LAKE ONTARIO EVENINGS

In 2009, TRCA, in association with the Toronto & Region RAP and CTC (Credit Valley, Toronto, and Central Lake Ontario) Source Water Protection, launched the Lake Ontario Evenings speaker's series. Each of these evenings is organized around a specific issue faced by Lake Ontario and brings together academics, government officials, community organizations, and the public for a relaxed evening of information sharing and discussion. A local focus on Toronto & Region - including local speakers, updates on local projects, and session themes selected by attendees - also ensure environmental issues of local interest have a forum for discussion.

The first two Lake Ontario Evenings addressed issues of Great Lakes water diversion and biodiversity, respectively, and received strong community support. Planning is now underway for future Lake Ontario Evenings through to 2012.

www.torontorap.ca

ADMINISTRATION

Since 2002, the Toronto & Region Remedial Action Plan is administered by the Toronto and Region Conservation Authority (TRCA) as per agreements with Environment Canada and the Ontario Ministry of the Environment. These agreements have also provided financial support to TRCA programs and initiatives that advance RAP objectives. These programs that were recipients of this support between 2007 and 2010 are profiled in this update report.

One of the most powerful outcomes of the collaborative approach between the federal and provincial governments and the TRCA has been the ability for RAP funds to be combined with external project funding. This leverage has enabled RAP supported programs to expand far beyond the size and scope that could be sustained with RAP funds alone; indeed, the only entity supported entirely by the RAP is a project manager to coordinate RAP administration, data consolidation, and communications

It is therefore important to recognize the scope of support the profiled projects received from municipalities and government departments, non-governmental organizations and foundations, private businesses, the academic community, and community volunteers; the graphs are scaled proportionally to reflect the RAP project contributions relative to total contributions. To avoid duplication, Research and Monitoring are included in the theme areas with which they are most closely affiliated.



SUSTAINABLE WATERSHEDS

Looking forward, much remains to be done. Continued research and monitoring, the advancement and uptake of Low Impact Development technologies, the implementation of infrastructure retrofits, and in particular the sustained efforts of Toronto and Region's communities, are all vital in keeping the Remedial Action Plan moving forward.



www.torontorap.ca