

# Rouge River

## State of the Watershed Report



**Regional Monitoring Program**

## TABLE OF CONTENTS

3.0	REGIONAL MONITORING PROGRAMS .....	3-1
3.1	Introduction .....	3-1
3.2	Regional Watershed Monitoring Network .....	3-1
3.3	Other Monitoring Initiatives.....	3-6
3.4	References .....	3-7

## CHAPTER

# 3

# REGIONAL MONITORING PROGRAMS

## 3.0 REGIONAL MONITORING PROGRAMS

### 3.1 Introduction

Monitoring and reporting on change within the Rouge River watershed is achieved through the coordinated effort of many agencies, groups and individuals. Long term regional monitoring programs have been in place to varying degrees. These programs are critical to track changes in ambient watershed conditions over time, at a regional or watershed scale. Localized issue-specific monitoring projects, while often shorter in duration and narrower in focus, are important indicators of local changes that can contribute to an overall understanding of regional trends.

This chapter describes the Regional Watershed Monitoring Network (RWMN) associated programs that have been used as a primary source of data for reporting on current watershed conditions in this State of the Watershed Report. This outline also provided a basis upon which to evaluate the adequacy of the current monitoring network, as further understanding about the watershed was developed. Recommended changes in monitoring protocols or sites are incorporated into the final watershed plan.

### 3.2 Regional Watershed Monitoring Network

The RWMN is a partnership between agencies and organizations which cooperate in a monitoring program based on their individual and collective monitoring needs. Each participant in the network is responsible for some aspects of collecting, storing, analyzing, distributing, and reporting on data and information that are required by themselves or other partners in the network. By cooperating in a monitoring network, participants make more efficient use of resources by focusing their efforts on their expertise, and eliminating overlap by relying on other partners.

Toronto and Region Conservation (TRCA) developed the RWMN for its nine-watershed jurisdiction in 2000, in partnership with the City of Toronto, and the regional municipalities of York, Peel, and Durham (TRCA, 2000). It is widely recognized that long-term monitoring is a critical step in the process of understanding the condition of the watersheds. The establishment of this monitoring program fills a gap that existed since the mid 1990s, when the federal and provincial governments reduced their monitoring programs across the province.

The program also ensures the availability of data needed to report on progress at protecting and restoring watershed health, as required by the Toronto and Region Remedial Action Plan

(RAP), individual watershed management strategies and municipal “State of the Environment” reporting cycles.

Development and design of the monitoring program involved a review of historic and current monitoring programs in relation to the current reporting needs. Current needs were identified by indicators of interest, as set out in the RAP, watershed strategies and municipal reports. The recommended monitoring network, programs and protocols were the product of an extensive consultation process involving local stakeholders and international experts.

The spatial and temporal assessment of condition and causes of change in that condition, at the scales of subwatersheds, watersheds, the RAP area and the Lake Ontario waterfront in the TRCA's jurisdiction are the focus of this program. This program is not intended to be a substitute for performance monitoring associated with implementation projects or reach specific sampling to trace sources of disturbance or contamination. Additional “site specific” monitoring activities can be undertaken in order to address these questions at a smaller scale.

Key objectives for this program are:

- To provide a scientific knowledge base for the assessment of the ecosystem health of subwatersheds, watersheds, RAP area and the Lake Ontario waterfront;
- To build upon existing monitoring activities and avoid duplication between agencies, municipalities, and organizations;
- To identify ways to engage and involve the general public, interest groups and school groups in meaningful monitoring activities;
- To establish protocols for the collection, analysis, storage and distribution of monitoring data on the key indicators which are identified for the assessment of ecological health.

The monitoring program collects data on six major components:

1. Aquatic Habitat and Species
2. Fluvial Geomorphology
3. Terrestrial Natural Heritage
4. Surface Water Quality
5. Surface Water Quantity and Climate
6. Groundwater

Table 3-1 provides a summary for each component of the monitoring program and the key indicators used to evaluate the health of the Rouge River watershed. Included in this table is a brief description of the principal monitoring activities and the program partners who have been primary responsible. Maps illustrating the monitoring sites can be found in the appropriate chapters of this report, in association with a discussion of monitoring results.

**Table 3-1 Components of the Regional Monitoring Program in the Rouge River Watershed**

<i>Component</i>	<i>Indicator</i>	<i>Monitoring Activities</i>	<i>Agency</i>
Aquatic Habitat and Species	Invertebrates, Fish, Algae, Geomorphology, Habitat, Substrate, Macrophytes.	Fish surveys, in-stream habitat and stream temperature every three years; benthic invertebrate surveys annually. Twenty-six sites.	TRCA
Fluvial Geomorphology	Bank stability, Erosion rates Geomorphology, Substrate.	Repeat survey of single control cross-section, pebble count and erosion pin measurements every 3 years	TRCA
Terrestrial Natural Heritage	Habitat patch, Vegetation communities, Species.  Fixed monitoring	Air photo analysis on a five year cycle. Field surveys using Ecological Land Classification System (ELC) on a fifteen year cycle.  Eight fixed sites monitored seasonally by volunteers	TRCA
Surface Water Quality	Basic water chemistry, Organics/ metals and fish tissue contaminants, Aesthetics.	Monthly water quality sampling. Seven sites  Fish tissue contaminants updated as required	TRCA/OMOE/ City of Toronto OMOE
Surface Water Quantity and Climate	Stream flow, Precipitation, Snow. Baseflow	Nine stream gauges in the Rouge. Two snow course sites. Six precipitation gauges. Seven Low Flow sites	TRCA/ Env. Canada/ OMNR
Groundwater	Groundwater quantity, quality.	Monthly levels and annual water quality analysis at two sites.	TRCA/OMOE

### Aquatic Habitat and Species

Aquatic organisms are adapted to the many interacting physical, chemical, and biological factors that surround them and are dependent upon these factors for the maintenance of their health. Such factors include water temperature, water flow, nutrients, sediment, or contaminants carried in water, channel form and types of in-stream cover, to report a few. When a watershed becomes degraded, often the first clue is a change in the aquatic biotic community from a diverse robust community to one dominated by tolerant species. The aquatic biotic community should also respond positively to restoration and management actions, such as increased natural cover and riparian plantings.

While not continuous, various fisheries and stream assessment studies were undertaken by the Ontario Ministry of Natural Resources (OMNR) and the TRCA in the Rouge River watershed over the past fifty years. Current fisheries assessments are performed by both the TRCA and OMNR, with

samples collected throughout the watershed in 2003 and 2006. These inventories provide a comprehensive knowledge base for the aquatic component of the Regional Watershed Monitoring Program (RWMP). Fish communities and habitat within the watersheds are monitored on a three-year cycle, under this program.

### Fluvial Geomorphology

Fluvial geomorphology is a science that assesses the shape and form of a watercourse. A key component of the science is identifying the processes responsible for the characteristics of the stream channel. There are many different processes that may be at work within stream channels. The most important of these are physical processes, namely the movement of sediment (e.g., silt, sand, gravel) and water. Monitoring of fluvial geomorphology characteristics is beneficial to watershed studies as the processes at work within the channels can be identified and quantified. This provides a better understanding of the form (shape and pattern) and function of the stream system. This understanding can be used along with knowledge from other disciplines to assess the implications of land use change and response to watershed management actions. Fluvial geomorphology is monitored on a three-year cycle.

### Terrestrial Natural Heritage

The terrestrial natural heritage monitoring data are collected by a number of groups, including: OMNR, TRCA, ecological consultants and volunteers. In 1996, TRCA began developing a Terrestrial Natural Heritage Program to establish a framework for reporting on the health of the terrestrial system, among other management objectives. This program is coordinated with the RWMN.

The terrestrial monitoring program is designed to describe vegetation communities and map flora and fauna species distribution at three levels of detail: the landscape level, the vegetation type/community level and the species level. Air photo analysis combined with field surveys of approximately 4500 ha of natural cover per year across the TRCA's nine watersheds contribute to an assessment of landscape and vegetation type/community level conditions. To date, approximately fifty per cent of the natural cover in the TRCA jurisdiction has been surveyed. This TRCA data set also incorporates data collected by other agencies and volunteers. A volunteer monitoring component has been developed to facilitate volunteer monitoring of 66 fixed sites within the TRCA jurisdiction (eight of which are in the Rouge River watershed).

### Surface Water Quality

Historically water quality in the Rouge River watershed was measured under the Ontario Ministry of Environment's (OMOE) Provincial Water Quality Monitoring Network (PWQMN), beginning in 1964. Over the lifetime of the PWQMN there have been seventeen different sampling stations in the Rouge River watershed that have been active for a range of 2 to 28 years. Water samples were collected at monthly intervals, eight times a year, to provide data for the assessment of water quality conditions. In 2002 a renewed partnership between TRCA and the OMOE was formed, to resume water quality monitoring, since sampling in the Rouge River watershed under the PWQMN had been

discontinued in the mid-1990s. One historic site from the PWQMN and one new site are currently being sampled on a monthly basis within the watershed.

Water quality samples have also been collected by the City of Toronto Works Department. From 1971 to 1997 samples were collected on a monthly basis from City of Toronto streams and waterfront, under the Toronto and Area Watershed Management Studies (TAWMS) program. Currently the City samples three stream sites on a monthly basis in partnership with the TRCA's RWMN. In summary, there are a total of five monthly water chemistry sampling sites in the Rouge River watershed that provide data on basic chemistry and trace metals conditions. The City also monitors the water quality at the beaches, under the Beach Watch Program, with a primary focus on bacteria levels and other basic chemistry parameters.

The Ontario Ministry of the Environment programs, including Tributary Toxics Monitoring, Young-of-the-Year Biomonitoring and Sport Fish Contaminant Monitoring, also form part of the RWMN in the Rouge River watershed and are undertaken according to a set schedule which ensures that sites are sampled within a 3-5 year cycle. Limited monitoring has occurred in the Rouge River watershed to date.

### Water Quantity and Climate

The monitoring activities undertaken under the water quantity and climate component of the RWMN provide both direct information about the state/condition of water quantity in the Rouge River watershed as well as supportive information to aid in understanding the current biological conditions of aquatic habitat and species. The activities and monitoring carried out as part of the RWMP are designed to augment the TRCA's existing network of flow, precipitation and snow gauging locations throughout the region.

Streamflow in the Rouge River watershed is currently measured at nine stream gauges, with data collection going back to 1961. One of these gauges is maintained and monitored by the TRCA, while the rest are managed by either the local municipality, Water Survey Canada, or a private consulting firm (Schaeffers Consulting). An additional seven gauges are proposed throughout the watershed. There are also initiatives to monitor precipitation and snowpack in the watershed.

Summer low flow monitoring has been undertaken by the Geological Survey of Canada and TRCA at close to 200 sites in the watershed in the late 1990s. A regular monthly low flow monitoring program is being formalized that will visit seven sites between May and September annually.

### Groundwater

Groundwater levels have been monitored at a number of locations within the Rouge River watershed since the late 1970's, on an irregular basis. An extensive study of groundwater quality in the Rouge River basin was conducted by the OMOE in 1970 and 1974 and involved the analysis of 44 samples from the Duffins watershed and the Rouge River watersheds.

In 2001 and 2002 the TRCA entered into a partnership with the OMOE under the Provincial Groundwater Quality Monitoring Network (PGQMN). Under this partnership, TRCA is monitoring groundwater wells throughout its jurisdiction. Monitoring of groundwater at these sites will include monthly water level measurements and the annual collection of water samples for laboratory chemical analysis. There are currently two groundwater wells being monitored in the Rouge River watershed.

### **3.3 Other Monitoring Initiatives**

The monitoring efforts described under the RWMN are not the only form of monitoring in the watershed. It is also recognized that observations of watershed health by community groups, private business, municipalities and other agencies are important metrics of the watershed's response to change. Often these initiatives are localized in nature and focus on specific indicators of interest. These monitoring efforts also contribute information about the extent of various resource based activities in the watershed.

The following list outlines a few examples of other types of monitoring initiatives, undertaken by various agencies, municipalities, groups, and individuals. A more detailed account of specific data and information sources is included in each of the subsequent chapters in this report.

- Community Resources Centre monitors wetland species such as frogs;
- Toronto Zoo monitors snapping turtles in the Rouge River watershed in their Adopt-a-Pond program;
- Toronto Valley Naturalists conduct an annual deer census and Christmas bird count in cooperation with the Toronto Zoo;
- Water quality monitoring and benthic invertebrate sampling is carried out by volunteers and with the Rouge Valley Conservation Centre;
- Localized stream and lake water quality, flow, precipitation, erosion and benthic invertebrate monitoring (municipalities, TRCA, volunteers, community groups);
- Water quality and use monitoring by golf courses and other water users;
- Stewardship and regeneration project performance monitoring, at selected sites (e.g. by municipalities, local groups, TRCA);
- Stormwater management facility performance monitoring, at selected sites (e.g. by municipalities, TRCA);
- Municipal water supply well monitoring (groundwater levels, water quality);
- Water consumption monitoring (municipalities);
- Monitoring in conjunction with major infrastructure projects;
- Private well water quality analysis and septic system inspections (Health Units);
- Angling effort and harvest (OMNR);
- Visitor numbers (tourist operators);
- Monitoring associated with research projects, conducted by academic institutions.

### **3.4 References**

Toronto and Region Conservation Authority. 2000. *Development of a Regional Watershed Monitoring Network*.