Water quality

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A lot of demands are placed on the Grand River and its tributaries. They receive the effluent from 30 sewage treatment plants as well as runoff from rural farms and city streets.

At the same time, the river is a source of municipal drinking water as well as a place for canoeists, hikers and anglers to enjoy a day surrounded by nature.

All of those pressures underscore the work that has to be done to protect water quality.

Water quality in Grand River and its tributaries reflects:

- the geology and landscape features within the watershed
- land use and land management practices
- in-river processes
- seasonal variation and climatic variability

Part of the job of protecting water quality is accomplished by the GRCA's network of seven reservoirs. They ensure there is enough water in the rivers to accept the treated effluent from the sewage treatment plants in the watershed.

Water quality sampling at York.

However, there are many more pieces to the water quality puzzle. The GRCA uses information gained through monitoring, modeling and applied research to better understand and manage the river. This allows the GRCA, municipalities, the province and other agencies to take action to improve the health of the waterways.

Water quality monitoring and reporting

Data obtained through several monitoring programs provides the information needed to understand current conditions, identify trends and project future changes.

Continuous water quality monitoring network

Nine automatic water quality stations provide continuous reports on water temperature, pH levels, conductivity and dissolved oxygen. The information is sent automatically to the GRCA head office and is posted to the website. The information supports day-to-day decisions about reservoir operations as well as long-range water management planning.

Provincial Water Quality Monitoring Network

Conservation authorities across the province have worked with the Ministry of the Environment since the 1960s to monitor water quality. Water samples are taken regularly at 37 sites in the Grand River watershed between March and November. The ministry analyzes the samples and provides the data to the GRCA.

Project specific monitoring

Project-specific surveys help build understanding of specific areas or help address specific questions. For instance, physical, chemical and biological monitoring is completed on subwatersheds to evaluate development pressures on local creeks and streams.

Reporting on water quality

Information from the water quality stations and the provincial network is assembled and analyzed in regular reports on the state of water quality. An in-depth review of water quality conditions is completed every five years and a technical report is produced.

Modelling

The Grand River Simulation Model (GRSM) is a computer model, developed in the late 1970s and updated since then, that gives GRCA, municipalities and the Ministry of the Environment and Climate Change a better understanding of water quality issues in the central part of the watershed in the light of proposed changes.

For example, the model can be used to predict the impact on water quality that would follow the expansion or optimization of a wastewater treatment plant. This is information that municipalities and the province can use to plan upgrades.

The model covers the Grand River from the Shand Dam to Six Nations, and the Speed River from Guelph Lake to Cambridge.

Partnerships and project

Water Managers Working Group

The members of the Water Managers Working Group meet four times a year to discuss water management issues and align the workplans of their agencies to achieve the goals of the 2014 Water Management Plan. One of the Water Plan's goals is to improve water quality, river health and reduce the Grand's impact on Lake Erie. Many projects are underway to assist with meeting this goal.

Mapping Tools for Conservation

Through the Water Management Plan, water quality staff worked with Geomatics and Conservation Services staff as well as other agency water managers to develop high resolution topographic maps that can be used to map the flow of water across the landscape. These maps are useful to show where erosion may occur. Conservation Services staff used these maps to engage farmers around runoff and erosion problems that may occur on their farms. This work resulted in an increased number of soil erosion projects being implemented.

A harmless red dye is used to trace how quickly water moves downstream to a drinking water intake.

Workshops for sewage treatment plant operators were held as part of the Wastewater Optimization Project.

Wastewater Treatment Optimization

Since 2010, water quality staff have facilitated a project to improve the quality of treated sewage effluent through the use of the Composite Correction Program. The program enables and engages operators and managers of wastewater treatment plants with tools and approaches to improve wastewater treatment process control. This project is gaining momentum. With the support of the Ministry of Environment and Climate Change, Wastewater Treatment Optimization is seen as a win-win to improve water quality in the river as well as reducing the Grand's impact on Lake Erie.

Source Protection Planning

Under the Ontario Clean Water Act, watershed-based plans to protect drinking water sources are being developed. GRCA water quality staff have been involved in studies and analysis of water quality issues for surface water sources in the Lake Erie Source Protection Region which includes the Grand River, Long Point Region, Catfish Creek and Kettle Creek watersheds.

Great Lakes Water Quality Agreement and the Lake Erie Lakewide Action and Management Plan (LAMP)

The United States and Canada renewed the Great Lakes Water Quality Agreement with a special focus on phosphorus and Lake Erie water quality. The Grand River plays a key role and is highlighted as an important area of focus, especially since it is one of the largest contributors of phosphorus to the eastern basin of the lake. Water quality staff work with Lake Managers and and LAMP technical staff to align workplans to achieve the goals of the Grand's Water Management Plan and the LAMP.