

REGIONAL MUNICIPALITY OF WATERLOO
Elmira
Guelph
Rockwood
Eramosa River
Guelph Lake
WATERLOO
GUELPH

An **ACTION** Plan for the **Grand**

2016 Report on *Actions*



Partners

Municipalities of the Grand River watershed including:

- Township of Centre Wellington
- City of Guelph
- Regional Municipality of Waterloo
- City of Waterloo
- City of Kitchener
- City of Cambridge
- County of Brant
- Oxford County
- City of Brantford
- Haldimand County

Six Nations of the Grand River

Grand River Conservation Authority

Ministry of the Environment and Climate
Change

Ministry of Natural Resources and Forestry

Ministry of Agriculture, Food and Rural
Affairs

Environment and Climate Change Canada

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The **Water Managers Working Group**, a committee of senior staff from partner organizations, prepares this progress report annually and presents it to the **Grand River Implementation Committee** – an Executive Committee who oversees the progress of implementing the actions in the Grand River Water Management Plan.

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Summary

The *2016 Report on Actions* marks the third progress report summarizing the status of partner actions since the Plan was endorsed in 2014. Implementation continues with most partners continuing to meet quarterly to share their progress of implementing their actions.

Emphasis was on updating floodplain mapping and modelling tools – two very important adaptation strategies to ensure preparedness for extreme events. In February, researchers from the **University of Waterloo** highlighted research that illustrated increased frequency of weather extremes and the need to adapt to the changing conditions.

Stormwater management was highlighted in 2016 with a great deal of planning and work undertaken at the local municipal level in **Kitchener, Waterloo, Cambridge, and Guelph**. Evaluating actions for reducing both nonpoint sources and point sources to ensure water quality was a focus in April.

September's meeting was the annual joint meeting of policy planners and water managers. **Municipal Affairs** attended the meeting to get feedback on the coordinated review of Provincial Plans.

Securing water supplies was highlighted at the December meeting. Tier III water budgets for the **Region of Waterloo** and **Guelph** area have provided a great deal of technical information for decision-making to ensure future water supplies.

Population growth and development pressures continue especially in the headwater region: **Centre Wellington** is continuing to see rapid development while **Mapleton, Wellington North** and **Southgate** all have projects underway to determine how to expand their wastewater treatment plants. A new wastewater treatment plant is also being reviewed in the headwaters and **Brant County** and **Brantford** finalized their municipal boundaries.

Water Management Plan Goals:

1. Improve water quality
2. Ensure Water Supplies
3. Reduce Flood Damages
4. Build Resilience to deal with climate change

Collaboration & Partnerships

Water Managers continued to meet quarterly in 2016. Municipal policy planners and the Ministry of Municipal Affairs joined water managers in September for the annual joint meeting.

Many watershed issues require a collaborative effort to understand and develop best value solutions. The contribution of nutrients and sediment to the central Grand River region is one of these issues. To address this, the cities of **Kitchener, Waterloo, Region of Waterloo, GRCA,** and the **University of Waterloo** collaborated on a study evaluating existing monitoring efforts to determine whether contributing areas can be identified. Another key outcome of this work was the need to integrate monitoring efforts better to use existing data and effort more efficiently.

ECCC provided some project funding to the **GRCA** to continue to facilitate the implementation of the Water Management Plan and to ensure alignment with the Lake Erie Lakewide Action and Management Plan.

A Changing Climate

2016 was a moderate to severe low water year. Precipitation was low and evaporation was high but sufficient groundwater levels helped to add flow to the rivers. It was the first year of significant low water conditions since the Drought Contingency plan was written in 2014.

Reservoirs were used extensively to augment river flows in the summer considering the hot and dry conditions. Generally, low flow targets were met during the summer – the most sensitive time for aquatic life. River low flow targets were not met during the fall as water was being held back to ensure supplies over the winter months.

Proactive water management and conservation programs have built resiliency in the watershed to handle low water conditions. Municipal water conservation bylaws (e.g. outdoor lawn watering) have helped to reduce the peak water use during the summer period.

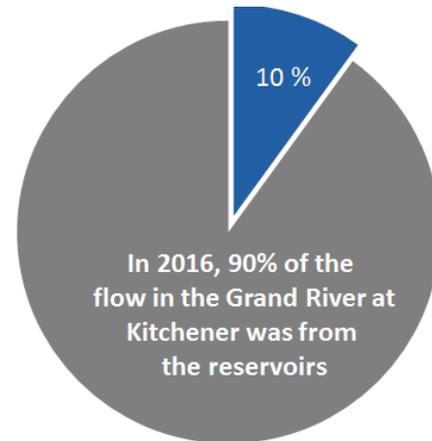
Planning for Extremes

Flood mitigation requires solid policies to protect life and property. Special policy areas are being reviewed in downtown **Waterloo** (Laurel Creek) and **Cambridge** (Groff Mill Creek) for managing risk.

MOECC continues to maintain and improve an inventory of water taking permits and actual water use across the province. Work continues on the Grand River Tier III Water Budget which has the potential to inform permitting.

MNRF provided funding to **GRCA** to complete pilot projects to test new technologies and approaches to deliver floodplain mapping. These pilot projects will create base mapping used to define the extent of flooding to better assess flood risk and to adapt the United States Army Corps of Engineers hydrology and forecasting models for use in Ontario.

Water management reservoirs provided much of the flow in the Grand River in the summer of 2016



Safety studies and routine maintenance on **GRCA** dams is an on-going commitment. **GRCA** completed **19** cost-shared projects in 2016 to ensure dams are safe and functioning properly. **GRCA** in consultation with **MNRF** finalized a Dam Safety review investigating the ability of the Conestogo Dam to pass the inflow design flood. A significant outcome of this study was the determination that an emergency spillway at Conestogo Reservoir is not required at this time.

Waterloo with support from the **GRCA** is updating floodplain mapping along Laurel Creek. **GRCA** initiated the Laurel Creek Dam Safety Review to align with the city's floodplain mapping study to be efficient. New approaches were used to update the hydrology upstream of Laurel Creek Dam to better reflect water storage on the landscape. **MNRF** provided funding to the University of Waterloo's Intact Centre to estimate the economic value of wetlands in the Laurel Creek watershed.

GRCA completed an update to the surface hydrology layer for the entire watershed – over 10,000 km of streams were mapped. This data layer is the foundation for managing water as it provides the basis for updating the regulation limit mapping for planning for flood hazard identification and improves our ability to model watershed processes like runoff (e.g. erosion processes) and groundwater recharge (e.g. Identifying closed drainage).

OMAFRA commissioned LiDAR (Light Detection and Ranging imagery) for the Lake Erie basin. This technology allows for the creation of Digital Elevation Models that can then support integrated landscape-hydrology modelling.

OMAFRA and **GRCA** worked together to pilot a soil erosion prediction tool “SoilCalculator” to estimate in-field field erosion. **GRCA** worked with **University of Waterloo** researchers to identify landscape and in-river erosion for Fairchild’s Creek. These tools will help to identify areas that would benefit from best management practices.

ECCC, on behalf of Canada, and the U.S. have adopted a 40% phosphorus reduction target for the tributaries draining to the western and central basins of Lake Erie. Due to the complexity of the eastern basin nearshore ecosystem, a target has not been set for the eastern basin.

MOECC continues to monitor two research sites in the Grand River Watershed (Larches Creek and Smith Creek) for the Multi-Watershed Nutrient Study. The **GRCA** and the **MOECC** continue to partner on collecting long-term ambient water quality data at 37 sites across the watershed. The **Region of Waterloo** continues to monitor the Grand, Speed and Nith Rivers above and below their wastewater treatment plants to measure the progress of investing millions of dollars to improve wastewater treatment.

Kitchener and **Waterloo** are working with the **MOECC** on the beneficial reuse of sediment captured in stormwater management ponds.

Urban stream restoration builds resilience



*“Rehabilitation of Clair Creek builds resilience to deal with extreme events”
Jessica Kellerman, City of Waterloo*

As part of **Kitchener’s** new Integrated Stormwater Management Master Plan, revised monitoring recommendations were made to ensure that the objectives of the master plan are achieved.

Waterloo is refocusing the Laurel Creek monitoring program to address stormwater performance. Both **Kitchener** and **Waterloo** continue to monitor high profile stream restoration projects (Forwell, Clair, and Filsinger creeks). **Brantford** expanded rainfall and stormwater flow monitoring to support a future update to their Master Plan.

Region of Waterloo completed their Water Supply Master Plan and is now implementing the Strange and William Streets Environmental Assessment that combines two groundwater systems together at one treatment plant to build flexibility and reliability in the water supply system. Further, the **Cambridge** Environmental Assessment will build on the Master Plan recommendations to bring the **Cambridge** East Water Treatment Plants to full capacity providing redundancy within the Cambridge water supply system.

MOECC is contributing to the Great Lakes Nearshore Framework and is supporting **ECCC** in developing a research plan for understanding *Cladophora* growth in the eastern basin of Lake Erie. The Lake Erie Action Plan should be final by 2018.

New stormwater targets set in **Kitchener** for include a volumetric target of **12.5 mm** and enhanced water quality requirements. **Waterloo** completed a SWM Pond assessment study and has started cleaning out priority ponds.

Centre Wellington is replacing the Elora mill street sewage pumping station to improve the operation of the station to safeguard against by-pass events to the Grand River.

Waterloo and **Guelph** are using new mobile devices and technology to improve annual stormwater inspections. This helps to streamlined data capture for better decision making.

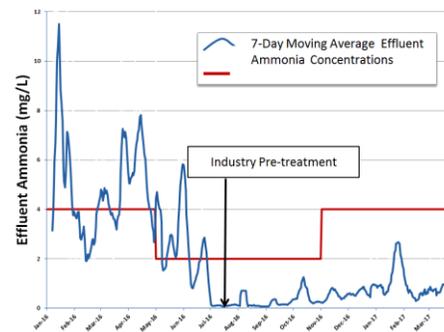
Building Resilience

GRCA continued the development of the Grand River Watershed Natural Heritage Systems Framework in 2016. Much of the southern Grand River region is complete.

The Conservation Authorities Act has specific regulations for protecting land in or near rivers, streams, ponds, wetlands, steep slopes, floodplains and the Lake Erie shoreline to help reduce damages from flooding or erosion. In 2016, **GRCA** reviewed **291** permits for construction in and around wetlands while they reviewed **187** floodplain permits.

OMAFRA launched the development of an Agricultural Soil Health and Conservation Strategy with a discussion paper on soil health and how it is linked to climate change, water quality and water quantity.

Effective sewer use bylaws help stabilize effluent quality in Brantford



“Through enhanced process control, good data collection and an effective sewer use bylaw, we have been able to have better control of ammonia in our final effluent”

Tim Howarth, City of Brantford

Investing in people enhances skills and improves operations. Improved process control in many wastewater treatment plants have improved effluent quality and deferred substantial capital costs. **Southgate Township, Wellington North, Centre Wellington, Region of Waterloo, Guelph, County of Brant, Oxford County, Brantford, and Haldimand County** all continue to participate in the Watershed-wide Wastewater Optimization community of practice.

The wastewater treatment plant upgrades provided the **Region of Waterloo** an opportunity to build resilience into infrastructure and re-engineer the effluent pumping stations to accommodate anticipated higher peak flows in the river. They elevated the aeration building, motor control and electrical systems at Kitchener WWTP for flood proofing.

Region of Waterloo is working on several pilots to optimize chemical addition to improve performance at the Galt WWTP related to phosphorus removal, tertiary filter performance and biosolids management. Another study is testing new technology to improve the secondary treatment and increase treatment capacity.

Brant, Region of Waterloo, and Centre Wellington continue to participate in Performance Based Training facilitated by the **MOECC** to achieve improved effluent quality at the Paris, Hespeler and Elora WWTPs, respectively. Four modules were held that covered process control, quantifying performance potential, and sludge treatment and handling.

MNRF advanced work in the middle Grand River, from Breslau to Freeport, to determine Best Bets for enhancing aquatic habitat. Re-engineering river form may help to enhance the functions that the river provides for fish and other aquatic organisms. It may also help to improve the river's assimilative capacity.

Research on the southern Grand River by **MNRF** has highlighted the decreasing trend of the walleye population. Current methods for maintaining the population such as the hand transfer of fish over the Dunnville Dam, have limited effectiveness.

Grand River Fish Management Plan Implementation Committee continued work to prioritize 18 GRCA-owned dams, weirs and fishways for further study to determine whether modification or removal would help support building in-river resilience.

Kitchener collaborated with REEP Green Solutions to educate, promote and transform two residential neighbourhoods through the Rain Smart Neighbourhoods Project. This project has already inspired multiple residential property owners to implement best practices for stormwater management.

Best Practices in wastewater treatment



“Wastewater Operators, who are knowledgeable and are empowered to make data-based process decisions mitigate risk of [plant] process failure”

Tim Robertson, City of Guelph

The **Guelph** and **Region of Waterloo** continue to improve their water efficiency and actively manage water demand through various conservation programs to meet future reduction goals of **138** and **165** litres per person per day respectively. The **Region of Waterloo** also has a certification program for restaurants and businesses to reduce water consumption.

Guelph's Water Loss Mitigation Strategy will help reduce water loss through the distribution system – reducing water loss is a huge ‘gain’ for ensuring water supplies. Similarly, **Waterloo** has started their “Smart Metering” where they can quickly identify leaks for maintenance. **Centre Wellington** is also working on a leak detection project to help advance conservation efforts.

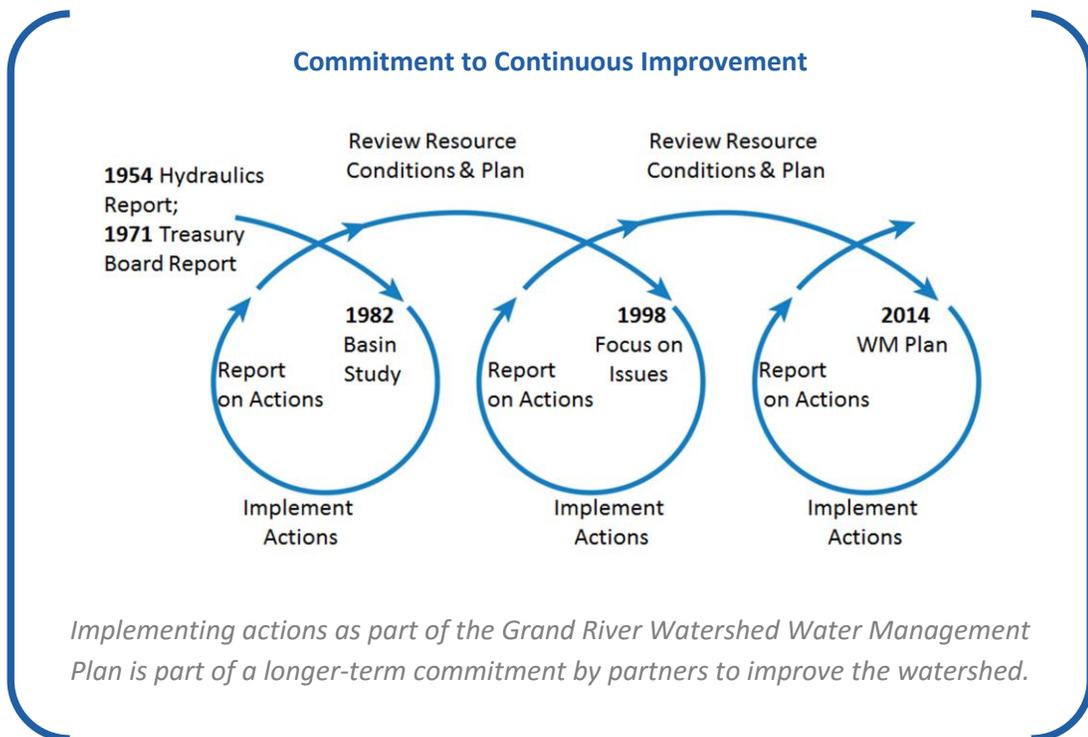
Guelph is continuing to pilot Annamox to deal with high ammonia from biosolids dewatering with success.

Continuous Improvement

Many of the actions in the Plan are underway. Moving water management forward is about balancing priorities and seizing opportunities when funding and capacity are available. Some actions are not scheduled to start until 2019 such as a review of the reservoir operating policy or undertaking a comprehensive watershed conditions report. As water management activities in the watershed continue by all Plan partners, it is important to ensure that we share information and build on the best practices that have already started.

The following highlights the major activities over the next 2-3 years:

- **MOECC** will be moving forward with the Low Impact Development Guidelines in 2017
- **Guelph** is to update wastewater master plan in 2017-18
- **Waterloo** to update SWM Master Plan in 2017
- **Region of Waterloo** continues to upgrade the Kitchener wastewater treatment plant with the construction of new aeration tanks and secondary clarifiers and a new tertiary filter process by 2018
- **Centre Wellington** to start a Water Supply Master Plan in 2017 and to be completed by 2018
- **Region of Waterloo** is planning to upgrade the Waterloo WWTP aeration tank in 2018 to support nitrification.
- **GRCA** will help to facilitate the completion of the Watershed Conditions report for 2019 to evaluate the progress toward achieving the Plan's goals
- **ECCC, AAFC, MOECC, OMAFRA** and **MNRF** will be finalizing the Domestic Action plan for reducing phosphorus to Lake Erie in 2018



Summary of Progress

Partnerships and Collaboration

- A.1. Ongoing support for the Water Managers Working Group and
- A.2. Reporting on Actions and Watershed Conditions
- A.3. Plan Review

Framework for Integrated Water Management

- B1. Ensuring the linkage of the Water Management Plan with other Watershed-based plans
- B.2 Establishing and reviewing water management indicators and targets

Ensuring Water Supplies

- C.1. Water supply master planning
- C.2. Water demand management
- C.3. Securing water supplies
- C.4. Agricultural water use
- C.5. Reservoir operations to maintain operational targets
- C.6. Reservoir operations for adapting to a changing climate
- C.7. Reservoir operations to maintain waste assimilation targets (7Q20)
- C.8. Reviewing permits to take water on the regulated river
- C.9. Verification of environmental flows
- C.10. Creating a groundwater-surface water working groups
- C.11. Improving understanding of groundwater resources
- C.12. Local water management plans in areas of conflict
- C.13. Creating and maintaining a drought contingency plan

Improving Water Quality

- D.1. Upgrading wastewater treatment plants
- D.2. Wastewater treatment plant optimization and best practices
- D.3. Effective sewer use bylaws
- D.4. Best practices for spill prevention and reporting.
- D.5. Maintaining the Grand River Simulation Model for cumulative effects assessment
- D.6. Subwatershed or regional assessments for managing water quality and quantity
- D.7. Maintain and enhance the rural water quality program to promote/implement best practices
- D.8. Managing nitrogen to reduce increasing nitrate levels
- D.9. Promoting best practices for municipal drains
- D.10. Promoting best practices for urban stormwater
- D.11. Managing road salt and water softeners to reduce increasing levels of chloride
- D.12. Continue to monitor and evaluate pathogens in the Grand River
- D.13. Evaluate options for improving the southern Grand River
- D.14. Evaluating small dams and on-line weirs for water quality improvements
- D.15. Data collection for improved decision making

Reducing Flood Damages

- E.1. Dam and dyke safety studies to ensure flood control infrastructure
- E.2. Major system assessments for stormwater systems.
- E.3. Update and improve floodplain mapping in flood damage centres
- E.4. Flood inundation mapping for developing vulnerable structures database
- E.5. Reliable flood communication systems
- E.6. Continuous improvement of flood forecasting and decision support tools
- E.7. Maintaining an emergency communications framework
- E.8. Reducing flood damage potential in vulnerable communities
- E.9. Reducing flood damages due to ice

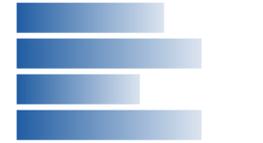
Next Steps

- Maintain a venue to advance discussion on new, innovative water management approaches

Progress
0 -----100%



to start in 2019



to start in 2019

