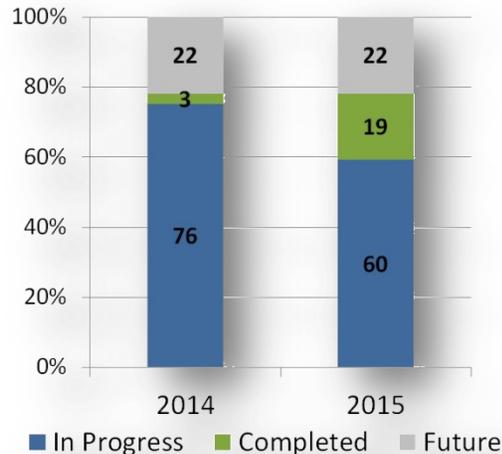


Highlights

Progress of Plan Implementation: of the 163 actions listed in the plan, most are in progress or already completed.



“The collective impact from the actions completed by Plan Partners and highlighted in this progress report moves us toward achieving the Plan’s goals and a more resilient watershed.”

Joe Farwell,

Chief Administrative Officer,
Grand River Conservation Authority

The annual progress report is prepared by the **Water Managers Working Group**.

2015 Report on Actions

Water managers continue to meet quarterly. The meetings not only offer a forum to share progress, but also to discuss some of the challenges and barriers to implementation and identify solutions.

Integrating municipal land use and watershed water management. A joint meeting between Water Managers and Policy Planners discussed ‘Places to Grow’ and the Province’s Coordinated Landuse Planning Review.

There is a commitment to practical asset management in the watershed:

Plans are in place to prioritize infrastructure investments. Upgrades are underway at wastewater plants that will improve water quality. Dam safety studies ensure that water management infrastructure will work when needed. Water efficiency plans help municipalities achieve demand management targets.

Taking care of our assets will ensure long-term sustainability. Regular maintenance of stormwater ponds will ensure that these assets continue to perform. Investing in operator skills and knowledge through wastewater optimization will yield improved effluent quality, economically.

Building resilience for adapting to climate change continues. The Rural Water Quality Program completed 453 projects; urban streams were naturalized; and 5500 future water managers were engaged at local groundwater festivals!

Sharing knowledge is critical for water management. Maintaining the shared knowledge and understanding of water management across all partner agencies in the watershed is challenging as members move into different positions or retire. Succession planning is critical to ensure long-term success.

Grand River Water Management Plan Goals

1. Reduce flood damage potential;
2. Ensure sustainable water supplies for communities, economies and ecosystems;
3. Improve water quality to improve river health and reduce the river's impact on Lake Erie;
4. Increase resiliency to deal with climate change

Plan Partners

- Brant County
- City of Brantford
- City of Cambridge
- Township of Centre Wellington
- Environment and Climate Change Canada
- Grand River Conservation Authority
- City of Guelph
- Haldimand County
- City of Kitchener
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Oxford County
- Region of Waterloo
- Six Nations of the Grand River
- City of Waterloo

Introduction

During the development of the Water Management Plan (WMP), Water Managers noted that actions started when the discussion started. Consequently, many of the actions in the Plan are well underway. The plan was finalized and endorsed in 2014, and 2015 marks the first full year of Plan implementation.

Even though the endorsement marked a significant milestone, Plan partners remain diligent and continue to meet, report on progress and share their experiences. Much like the water cycle, water management is ongoing and continuously needs to be monitored and adjusted to ensure best practices are achieving the desired result.

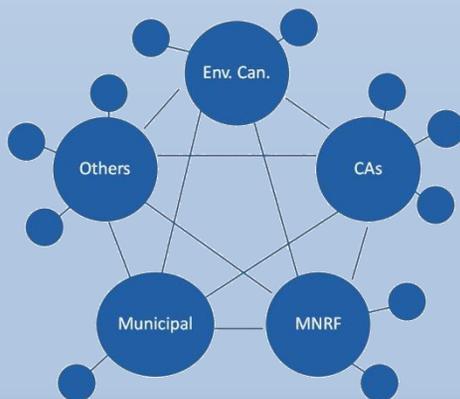
Pressures in the watershed continue: urban development in Brantford/Brant will require careful stormwater management and subwatershed planning in sensitive areas; Centre Wellington started multi-year studies to address the Province's 'Places to Grow' requirements; and the feasibility of five new wastewater treatment plants was investigated in smaller watershed communities to accommodate proposed developments. The capacity of the river system to receive additional wastewater, especially in the headwater regions, remains unanswered.

"2015 saw the most building permits issued in Centre Wellington"
J. Kerr, Township of Centre Wellington

A long-standing challenge was resolved. The Ontario Municipal Board appeal of the Region of Waterloo's Official Plan was settled. The countryside line was set - a line that represents the long-term boundary between future urban areas and the countryside. The protected countryside will safeguard critical regional groundwater recharge areas, conserve valuable farmland and manage future urban development.



Grand River Conservation Authority (GRCA), through support from **Environment and Climate Change Canada (ECCC)**, the **Ministry of Environment and Climate Change (MOECC)** and the **Ministry of Natural Resources and Forestry (MNRF)**, continues to provide opportunities to bring Plan Partners together.



ECCC and **GRCA** collaborated on their **Networks of Networks** project to pilot climate data sharing to improve response to severe weather events – an adaptation to a changing climate.

Working together

Maintaining engagement of all partners will continue to be challenging. Water managers are pulled in multiple directions; they manage complex systems or processes for their agency within time and fiscal restraints. They plan and act within their own mandate yet try to keep sight of the watershed perspective.

GRCA hosted four water managers meetings; a water demand management workshop; a phosphorus monitoring and research meeting; a Whiteman's Creek water budget workshop; a wastewater optimization workshop; monitoring optimization meetings; and stormwater managers meetings.

Research provides valuable information and insight into water management challenges. The cities of **Waterloo, Kitchener, and Cambridge** and the **Region of Waterloo** sponsored researchers from the *Interdisciplinary Centre for Climate Change* at the **University of Waterloo** to develop climate change projections for the region that will inform water management planning. This work will also benefit the greater watershed.

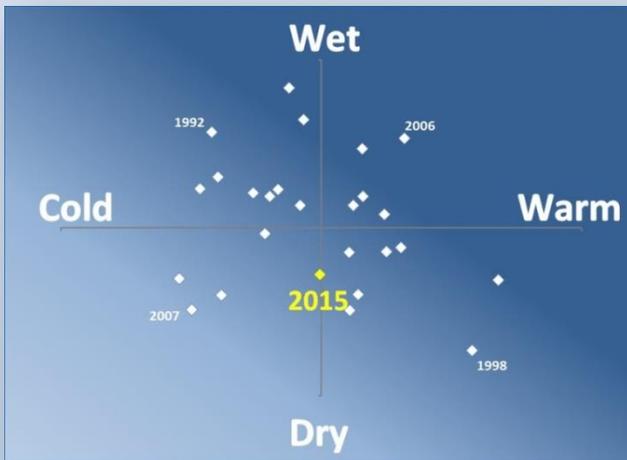
GRCA hosted the **Geological Survey of Canada** and brought together groundwater experts to discuss data and model management needs.

Haldimand County shared their knowledge and lessons learned to enhance wastewater treatment plant performance with **Wellington North**.

GRCA, Oxford County, Centre Wellington, Brant County, Norfolk County and the Region of Waterloo are taking active roles in MOECC's pilot test of Performance Based Training for Wastewater Optimization.

2015 was the final year in a multi-year research study sponsored by the **Canadian Water Network**. Researchers from the **Universities of Waterloo, Wilfrid Laurier, Guelph** and **Western** teamed up to study cumulative effects in the watershed. Researchers presented a synthesis report to Water Managers.

Plan Partners met to discuss monitoring activities and look for efficiencies. Open and accessible data is a future goal for all partners.



An annual summary of long-term precipitation and temperatures at the Shand Dam suggests that the temperatures were average and conditions were a bit dry.



Research provides valuable insight into river health. Here, graduate students are collecting fish in the Grand River for their studies.

Watershed Conditions

2015 was a year of weather extremes: February was the coldest month on record; December was the warmest month. Dealing with extremes in climate requires adaptation and mitigation plans. **Kitchener, Waterloo** and the **Region of Waterloo** have included adaptation plans into their strategic planning.

Warm spring days and cool nights allowed for a gradual warm up and a slow release of water from the snowpack. It also allowed ice to break up slowly. This avoided any major flooding and made it relatively easy to fill the reservoirs.

The summer months had lower than normal precipitation however, **all low-flow targets were met** in the regulated river reaches. This weather triggered **low water response** in the Eramosa, lower Nith, Whiteman's and McKenzie Creeks due to low river flows. Low precipitation was also reflected in the shallow groundwater on the Norfolk Sand Plain with lower than average levels.

Over the course of 2015, there were a number of watershed statements made to ensure timely communication of watershed conditions.



Dissolved oxygen levels were above the objective during the summer. Levels showed the largest variations in May likely due to the dry conditions and warm temperatures. Research and water quality monitoring results from the Grand River through Blair suggest that conditions are improving because of significant wastewater treatment plant upgrades being done by the **Region of Waterloo**.

Asset Management

Assets, whether municipal infrastructure or natural watershed features, are the building blocks of our communities and our watershed. Managing assets requires careful planning (see **Plans in place**) and care (see **Taking care**) to continue to build resilient communities, economies and ecosystems (see **Building resilience**).



Number of permits reviewed by **GRCA** to reduce flood damage potential and protect important hydrologic functions

309

permits were reviewed to ensure that future flood damages are reduced

415

permits were reviewed near wetlands to ensure water stays in place and not cause flooding downstream

Plans in Place

Plans and studies help to identify priorities to reduce risk and benchmark progress. The following highlights some of the many plans being undertaken to manage assets to ensure water supplies, improve water quality, reduce flood damages, and build resilience to deal with a changing climate.

The **GRCA** owns and operates seven multi-purpose water management dams estimated to be worth over 1 Billion dollars. **GRCA** initiated a dam safety assessment for the Laurel Creek dam in **Waterloo** and continued dike safety projects in **Brantford**, **Cambridge** and **Kitchener**.

Extreme rainfall events require improved floodplain mapping in high-risk areas, such as Special Policy Areas. The cities of **Cambridge** and **Waterloo** are working with **GRCA** to update their Special Policy Area's in Groff Mill Creek and Laurel Creek using more advanced mapping tools and high resolution mapping data.

City of Kitchener completed a floodplain modelling study for a portion of Schneider's Creek. **MNRF** and **GRCA** are working together to pilot various floodplain-mapping techniques to be used in future floodplain projects. **GRCA** is investigating funding opportunities through **Natural Resources Canada** and **Public Safety Canada** as part of their Natural Disasters Mitigation Program which funds floodplain mapping.

Soil is a critical asset for farmers. **OMAFRA** provided support to **GRCA** for further development of high-resolution mapping data in 10 priority catchments in the upper Nith and Conestogo River basins. These maps help to identify important areas to reduce erosion and supports outreach efforts for enhanced soil erosion control.

The **Region of Waterloo's** central Grand River, Speed and Nith river monitoring program is ongoing; the program supports information on the health of the river system and provides valuable data to track progress of infrastructure investments.

Subwatershed plans promote the integration of land use and water management planning. Plans help prioritize actions needed to develop sustainably. In the Grand River watershed, there are 25 subwatershed plans completed or underway, covering about a quarter of the watershed.

Stormwater management facilities are important municipal assets that hold onto water, reduce downstream flooding and improve water quality. Stormwater pond on Homer Watson Blvd, Kitchener.



Subwatershed studies characterize the natural assets that provide important services such as groundwater recharge or areas that hold onto water (e.g. wetlands). **GRCA, Region of Waterloo** and **City of Kitchener** continue to monitor and characterize seven catchment areas for subwatershed planning. **City of Waterloo** completed the North Waterloo Subwatershed Study.

City of Kitchener in partnership with **GRCA, Region of Waterloo** and the **Township of North Dumfries** drafted a State of the Watershed Report for Upper Blair Creek. The report establishes pre-development conditions and targets for future water quality and flow requirements and makes recommendations for updated system-wide and during-development monitoring.

Region of Waterloo in partnership with **GRCA, Township of Woolwich** and **City of Cambridge** started to develop an East Side Lands Master Environmental Servicing Plan (Stage 2).

GRCA began characterization of Fairchild's and Mackenzie creek subwatersheds in the **Brant, Brantford, Haldimand** and **Six Nations of the Grand River** area to assist with identifying important watershed assets and information gaps.

City of Waterloo completed a Stormwater Facility Inventory and Condition Assessment Study. Results identified short and long-term maintenance priorities including facility repairs, sediment removal and preventative maintenance.

City of Guelph completed a stormwater management funding study to determine best approaches for managing their stormwater assets. **Kitchener** and **Waterloo** continue to implement their stormwater utilities.

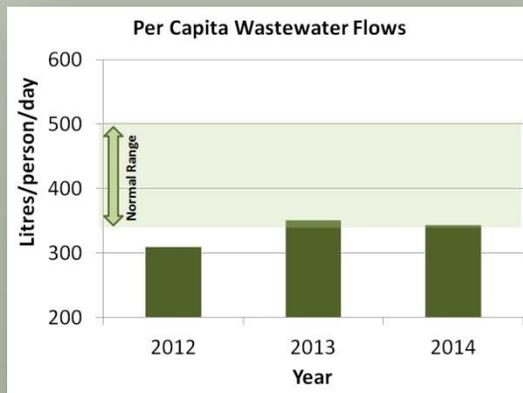
The **Region of Waterloo** kicked off two master planning processes: an update to the Wastewater Master Plan focusing on updating population estimates, predicting river water quality and determining next steps for wastewater infrastructure needs and priorities; and the Biosolids Strategy to develop a long-term management plan for the Region's biosolids.

City of Waterloo completed a sanitary sewer master plan, and upgraded two pumping stations. Upgrades included features to minimize the risk of spills.

The **GRCA** maintains a 500 m section of dike and channel on the Conestogo River in the **Township of Mapleton**. The removal of course sediments reduces nuisance flooding.



Wastewater flows from 28 plants average 335 litres, per person, per day, well below the typical range of 350-500. The standard of wastewater treatment in the watershed is good and is improving through a commitment to plant optimization and upgrades.



Taking Care

Preventative maintenance strategies and attentive operation of critical municipal and watershed assets help prolong their life and ensure they are functioning properly. Effective operations and maintenance of assets can ensure future water supplies, improve water quality, reduce flood damages and build resilience.

The **GRCA** completed gate inspections on the Woolwich Dam near Elmira and installed new gate gain heaters at Shand Dam near Fergus to keep them in proper working order. This is an adaptation measure for improved dam operations during the winter, an expected need as a result of a changing climate.

GRCA and the **City of Brantford** worked together to completed repairs on the dike system to continue to protect residents of low-lying areas in West Brant, Eagle Place and Holmedale.

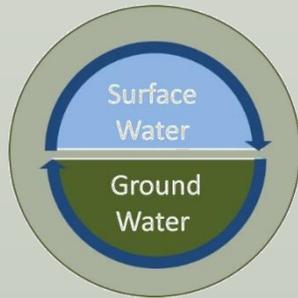
Wastewater Managers released the second annual report on wastewater treatment plant performance and hosted two workshops for the operators and managers at 11 municipalities that own and operate plants in the watershed. Staff from Six Nations, Mississaugas of the New Credit and the MOECC Safe Drinking Water Branch also participated.

MOECC initiated a Performance-based Training pilot project with several watershed wastewater treatment plant operators and administrators participating.

Southgate (Dundalk) and **Wellington North** (Arthur) completed comprehensive performance evaluations of their plants with follow up plans developed to improve plant performance.

The **Watershed-Wide Optimization Program** promotes improved wastewater treatment across the watershed by encouraging the adoption of the Composite Correction Program. This approach invests in building skills in operators to improve plant performance.

Characterizing groundwater-surface water interactions is vital to managing water resources in the Grand River watershed



The maintenance of stormwater assets is critical to ensuring proper working order.



Kitchener cleaned out 5000 metric tonnes of sediment from stormwater ponds.

Kitchener, Guelph, Waterloo and **MOECC** started a pilot to investigate the beneficial re-use of stormwater sediments.

GRCA, OMNRF, OMAFRA, MOECC and **Brant** and **Oxford** counties are collaborating on the development of a fully integrated groundwater-surface water model for Whiteman's Creek as part of a Tier III water budget study for drinking water source protection planning.

The Grand River Tier III Water Budget tools have the potential to inform the permit to take water process. **MOECC** continues to work on improving and streamlining the process, particularly agricultural permits and **GRCA** is committed to maintaining the tool for decision-making.

MOECC hosted a spring information session on the permit to take water program for farmers in **Brant, Haldimand** and **Norfolk** counties. This assisted farmers to understand the permit process and the required paperwork. This will lead to improved compliance and better reporting of water use.

Region of Waterloo has ongoing investigations to secure future water supplies in Cambridge and North Waterloo while new groundwater wells were investigated in **Southgate** (Dundalk), **Brant** (St. George) and **Hamilton** (Lynden).

The **City of Guelph** and the **Region of Waterloo** continue to reduce water demand. Both municipalities started on updates to their Water Efficiency Plans. The **Region of Waterloo** started a restaurant water efficiency certification program to reduce demands in this sector

A **Water Efficiency Plan** is part of a municipal Water Supply Master Plan that outlines the community-accepted water conservation strategy for efficient use of water supplies.

The **City of Guelph** and the **Region of Waterloo** have an ongoing joint study on alternative options and performance improvement of water softeners to help reduce chlorides in wastewater.

> **1,160,000**

kilograms of phosphorus

has been kept on the land since 1998 by implementing rural best management practices

Naturalization of Filsigner Creek in the **City of Kitchener** will build resilience to reduce local flooding and improve water quality.



Building Resilience

Building resilience includes increasing the knowledge and abilities of water managers. It also includes rehabilitating or restoring the necessary watershed infrastructure to ensure our natural systems can cope with development pressures and an increasingly variable climate. The following Plan actions contribute to building watershed resilience.

On behalf of the counties of **Brant, Wellington, Haldimand, and Oxford**, the cities of **Brantford** and **Guelph** and **Region of Waterloo**, the **GRCA** supports private landowners in the completion of 453 projects on rural lands to keep 4200 kg of phosphorus on the land and to ensure that agricultural lands are more resilient. The Federal Habitat Stewardship Program provided additional funds.

Increasingly more stormwater managers are using natural design principles to build resilience in urban streams to improve water quality, and reduce flooding.

The **City of Kitchener** completed 1.8 km of stream naturalization in tributaries of Schneider Creek. Concrete channels were removed; a winding creek with riffles and pools built; and the stream was reconnected with its floodplain. This work will reduce sediment loads to Victoria Park Lake.

The **City of Waterloo** invested in the enhancement of the natural character of the area to improve water quality and restore habitat in Forwell Creek. A more naturalized creek corridor will result and improve stormwater management in the areas. In addition, they have started an assessment of Clair Creek to improve channel designs to improve water quality, stream stability and enhance aquatic and terrestrial habitats.

City of Cambridge has approved developer plans to restore Middle Creek in the Hunt Club subdivision and take an on-line pond off-line, and construct a new channel using natural channel design methods.

Fisheries Management Plan Committee invested in making deeper pools in the river to provide more fish habitat. Grand River near Inverhaugh



New mapping tools will help engage farmers to reduce soil loss by adopting erosion control practices in problem areas.



The **Grand River Fisheries Management Committee**, chaired by **MNRF** and **GRCA** continues to work on improving the river system for fish habitat and water quality. The Grand River, near Carroll Creek, was improved by deepening pools, narrowing the channel and placing large boulders for fish cover.

GRCA restored over 40 hectares of erodible farmland to forests and over a hectare of seasonal wetlands were created to keep water on the landscape, and reduce erosion near the Conestogo Reservoir.

City of Brantford started a public consultation process on re-visioning Mohawk Lake, an historic canal system built in the 1800s for navigation, but now primarily receives stormwater from the city.

OMAFRA's Great Lakes Agricultural Stewardship Initiative provided funding to increase **GRCA**'s capacity to engage landowners on stewardship issues. Funding from the Canada-Ontario Agreement on the Great Lakes provided support for soil erosion workshops held in Linwood, Kohler, and Alma.

OMAFRA funding also supported the **GRCA** to complete the update of the surface hydrology-mapping layer using a 3D mapping technology. This surface hydrology also contributes to the creation of Digital Elevation Models used for floodplain mapping, identification of nonpoint source nutrient areas and improved subwatershed delineation.

OMAFRA supported **GRCA** to map erosion-prone areas in the upper Nith and Conestogo basins.

GRCA, in partnership with the **Region of Waterloo, Guelph, Wellington, Brant, Brantford, and Haldimand** host annual Children's Water Festivals. Through hands on learning, more than 5500 students were engaged in learning about the value of our water resources. This builds the capacity of future water managers!

Region of Waterloo continues with their Curb the Salt program to reduce salt application on streets, parking lots and sidewalks. This will help to reduce chloride levels in local groundwater.

Slow and Steady...

Although many of the Plan's actions are underway, a few are to start in the short term. In an adaptive management framework, water managers review progress and adjust plans as necessary for continuous improvement.



Major upgrades at the Waterloo Wastewater Treatment plant are expected in 2016/17.

Chloride levels in groundwater and in streams remains a concern. Programs like 'Curb the Salt' or 'Smart about Salt' continue in the watershed to reduce chloride at the source.

Salt impacts our water.

**CURB THE
SALT**

We all have a role to play.

Actions for 2016-17

- Canada, through **Environment and Climate Change Canada**, and the United States to establish phosphorus reduction targets for the eastern basin of Lake Erie.
- The **Region of Waterloo** will finish the major treatment upgrades at the Waterloo wastewater treatment plant; upgrades to the digestion process at the Preston plant; SCADA upgrades at the Hespeler plant; and an upgrade to the treatment process at the Foxboro plant
- Master Servicing Plan is expected to be complete for the **County of Brant**, Paris settlement area
- **City of Guelph** anticipates the completion of a pilot plant to treat concentrated wastewater
- Environmental assessments to consider wastewater servicing and treatment are expected to be completed for the communities of **Wellington North** (Arthur), **Township of Mapleton** (Drayton), **Oxford** (Drumbo and Princeton) and **Brant County** (St. George)
- **City of Kitchener** anticipates completion of the updated Stormwater Master Plan
- **City of Brantford** plans to launch a stormwater flow-monitoring program and subwatershed master plan studies.
- **GRCA** will work with the **City of Waterloo** to update base mapping, hydrology and hydraulic modelling for Laurel Creek
- **City of Waterloo** to develop a stormwater master plan beginning in 2016 with completion anticipated in 2017; an Environmental Assessment will start on Silver Lake and Laurel Creek rehabilitation through Waterloo Park in 2017

Real-time river management:

The seven major reservoirs in the watershed are operated to reduce flooding and to ensure there is enough water in the river system to dilute treated wastewater effluent during dry periods. A review of reservoir operations is scheduled for 2018-19 to ensure reliability, especially as the climate continues to change.



In the future... are wastewater treatment plants going to be needed as water resource recovery plants?

Actions for 2018-19

- The **Region of Waterloo** expects to complete major treatment upgrades at the Kitchener wastewater treatment plant; upgrades at the Galt plant are to begin, including improvements to the tertiary treatment process
- **Centre Wellington** to complete their Water Supply Master Plan
- **GRCA** will review the reservoir operating policy and work with the MOECC to review low flows for wastewater planning
- **City of Waterloo** will implement the rehabilitation plan for Silver Lake and Laurel Creek that runs through Waterloo Park.
- **Water managers** will sponsor cost-benefit analysis for evaluating point vs nonpoint source controls for future water quality improvements
- **GRCA** will facilitate the completion of a water resources conditions report on behalf of Plan Partners by 2019 to gauge progress toward achieving the goals of the Plan.
- The **Implementation Committee** will review the Water Management Plan in 2019 & if necessary, initiate a process to update the Plan

2020 and beyond

- **County of Brant** will carry out studies with plans to upgrade the Paris and St. George wastewater treatment plants
- **Water Managers** will investigate producer-municipal partnerships jointly manage nutrients and organic wastes for energy production