



Grand River Source Protection Area

DRAFT UPDATED ASSESSMENT REPORT

*Prepared by:
Lake Erie Region Source Protection Committee*

*Under the Clean Water Act, 2006
(Ontario Regulation 287/07)*

April 4, 2019

SECTION 34 DOCUMENT AMENDMENTS

This Section 34 amendment includes Assessment Report sections with content that is considered draft, pending approval by the Minister of the Environment, Conservation and Parks. These draft sections were reviewed as part of previous public consultation process and Section 34 amendment. Previous amendment details are available upon request.

Draft Assessment Report Sections Pending Approval

- 1 - Introduction
- 3, Part 2 - Water Quality Threat Assessment Methodology
- 4 - County of Grey
- 12 - City of Hamilton
- 13 - County of Brant
- 17 - State of Climate Change Research in the Lake Erie Source Protection Region
- 19 - Conclusion
- 20-21 – References and Map References

The following two tables provide a high-level summary of amendments made to the Grand River Assessment Report, under Ontario Regulation 287/07, Section 34.

Amendments were made using the 2017 Director’s Technical Rules and Tables of Drinking Water Threats. Sections of the Assessment Report that were not updated as part of this Section 34 amendment may refer to the 2009 versions of the Director’s Technical Rules and Tables of Drinking Water Threats.

SECTION NUMBER	DESCRIPTION OF DRINKING WATER SYSTEM AMENDMENT
Section 1 Introduction	Executive Summary: Updated to reflect changes in content referenced in the body of the assessment report
Section 2 Watershed Characterization	Major revisions to the following sub-sections: <ul style="list-style-type: none"> - 2.3 Population, Population Density and Future Projections - 2.5 Ground Surface Topography - 2.6 Geology - 2.7 Groundwater - 2.8 Groundwater Quality Across the Watershed - 2.9 Climate in the Grand River Watershed - 2.10 Land Cover in the Grand River Watershed - 2.11 Surface Water Characterization - 2.12 Surface Water Quality - 2.13 Watershed Characterization Data Gaps - 2.14 Watershed Characterization Section Summary (new)
Section 3 Water Quality Methods	<ul style="list-style-type: none"> - Major revisions pertaining to methods used to map WHPAs and enumerate and classify quality-related threats to municipal supplies - Water Quantity Risk Assessment removed and added to later sections of assessment report (sections 17 and 18)
Section 5 County of Dufferin Vulnerability Assessment	Waldemar Well Supply <ul style="list-style-type: none"> - update to current average daily water takings for municipal wells PW1, PW2 and PW3

SECTION NUMBER	DESCRIPTION OF DRINKING WATER SYSTEM AMENDMENT
	<ul style="list-style-type: none"> - verification and inspections of septic systems within WHPA-A
<p>Section 5 County of Dufferin Vulnerability Assessment</p>	<p>Marsville Well Supply</p> <ul style="list-style-type: none"> - update to background information on municipal well PW1 - Shelburne Well Supply - addition of municipal well PW8 as back-up supply well - WHPA-A created for well PW8
<p>Section 5 County of Dufferin Vulnerability Assessment</p>	<p>Orangeville Well Supply</p> <ul style="list-style-type: none"> - update to significant threat numbers due to verification
<p>Section 7 City of Guelph Vulnerability Assessment</p>	<p>Guelph Waterworks</p> <ul style="list-style-type: none"> - update to current average daily water takings for all wells and intakes - addition of WHPA-A surrounding Glen Collector - update to Drinking Water Quality Issues Evaluation
<p>Section 8 Region of Waterloo Vulnerability Assessment</p>	<p>Cambridge Wellfields</p> <ul style="list-style-type: none"> - numerical groundwater flow model updated - WHPAs, vulnerability scoring, threats and issue assessment updated revised for Cambridge Wellfields (Hespeler, Pinebush, Blair Road, Clemens Mill, Elgin Street, Middleton Street, Shades Mill, Fountain Street, and Willard) - removal of Dunbar Road Wellfield - decommissioned well P6 - replacement wells drilled where existing well infrastructure deteriorated; P15 to be replaced by P15A, P10 to be replaced by P10B) - operational redundancy well G40 added
<p>Section 8 Region of Waterloo Vulnerability Assessment</p>	<p>Kitchener Wellfields</p> <ul style="list-style-type: none"> - numerical groundwater flow model updated - WHPAs, vulnerability scoring, threats and issue assessment updated revised for Cambridge Wellfields (Mannheim East, West, ASR and Peaking, Lancaster, Greenbrook, Strange Street, Parkway, Strasburg, Pompeii, Woolner and Wilmot Centre) - removal of Forwell Wellfield - decommissioned wells K70, K71, K41, K42A, K22A - replacement wells drilled where existing well infrastructure deteriorated; K13 to be replaced by K13A, K21 to be replaced by K21A, K4B to be replaced by K4C) - operational redundancy well K52 added
<p>Section 8 Region of Waterloo Vulnerability Assessment</p>	<p>Waterloo Wellfields</p> <ul style="list-style-type: none"> - numerical groundwater flow model updated - WHPAs, vulnerability scoring, threats and issue assessment updated revised for Cambridge Wellfields (Erb Street, William Street, and Waterloo North) - Replacement well drilled where existing well infrastructure deteriorated; W6A to be replaced by W6C)
<p>Section 8 Region of Waterloo</p>	<p>Rural Wellfields</p> <ul style="list-style-type: none"> - numerical groundwater flow model updated

SECTION NUMBER	DESCRIPTION OF DRINKING WATER SYSTEM AMENDMENT
Vulnerability Assessment	<ul style="list-style-type: none"> - WHPAs, vulnerability scoring, threats and issue assessment updated revised for Cambridge Wellfields (Ayr, Branchton Meadows, Elmira, Foxboro Green, Heidelberg, Linwood, Maryhill, New Dundee, New Hamburg, Roseville, St. Clements, Wellesley) - removal of Baden, Conestogo and West Montrose Wellfields - operational redundancy well NH4 added to New Hamburg Wellfield
Section 9 Region of Halton Vulnerability Assessment	Acton Wellfield <ul style="list-style-type: none"> - addition of 4th Line Well B as redundancy - update to water quality issues evaluation
Section 10 Perth County Vulnerability Assessment	Milverton Water Supply <ul style="list-style-type: none"> - minor editorial changes
Section 11 County of Oxford Vulnerability Assessment	Bright Water System <ul style="list-style-type: none"> - numerical groundwater flow model updated - WHPAs, vulnerability scoring, threats and issue assessment updated revised for Well 4A and Well 5
Section 11 County of Oxford Vulnerability Assessment	Drumbo-Princeton Water System <ul style="list-style-type: none"> - minor editorial changes Plattsville Water System <ul style="list-style-type: none"> - minor editorial changes
Section 14 City of Brantford Groundwater Vulnerability Assessment	Brantford Water Treatment Plant <ul style="list-style-type: none"> - minor editorial changes (i.e. system description) - municipal boundary change north of the City
Section 15 Six Nations Vulnerability Assessment	Ohsweken Water Treatment Plant System <ul style="list-style-type: none"> - minor editorial changes
Section 16 Haldimand County Vulnerability Assessment	Dunnville Water Treatment Plant <ul style="list-style-type: none"> - minor editorial changes
Section 17 Water Budget Framework and Methodology	New section detailing: <ul style="list-style-type: none"> - Tier 2 Framework and Tier 3 Framework - Tier 3 Water Budget Methodology
Section 18 Tier 2 Water Budget Results	<ul style="list-style-type: none"> - Out of date and irrelevant content was removed pertaining to Tier 2 methodology and results
Section 19 GGET Tier 3 Water Budget and Risk Assessment	New section detailing: <ul style="list-style-type: none"> - Tier 3 Water Budget and Risk Assessment completed for the municipal drinking water systems of the City of Guelph and the Township of Guelph/Eramosa, including the delineation of a new WHPA-Q
Section 20 Waterloo Tier 3 Water Budget and Risk	New section detailing: <ul style="list-style-type: none"> - Tier 3 Water Budget and Risk Assessment completed for the municipal drinking water systems in the Region of Waterloo,

SECTION NUMBER	DESCRIPTION OF DRINKING WATER SYSTEM AMENDMENT
Assessment	including the delineation of a new WHPA-Q
Section 21 Whitemans Creek Tier 3 Water Budget and Risk Assessment	New section detailing: - Tier 3 Water Budget and Risk Assessment completed for the municipal drinking water systems of the Whitemans Creek Subwatershed, including the delineation of a new WHPA-Q
Section 22 Orangeville and Amaranth Tier 3 Water Budget and Risk Assessment	- editorial changes to improve consistency and readability
Section 23 Halton Hills Tier 3 Water Budget and Risk Assessment	New section detailing: - Tier 3 Water Budget and Risk Assessment completed for the municipal drinking water systems in the communities of Acton and Georgetown, including the delineation of a new WHPA-Q
Section 24 State or Climate Change Research in Lake Erie Region	Minor update to subsection 24.3 Effect of Projected Climate Changes on Assessment Report Conclusions
Section 26 Conclusions	Updates to reflect changes to municipal systems within the assessment report
Section 27 References	Updated to reflect changes in content referenced in the body of the assessment report
Section 28 Map References	Updated to reflect changes in maps referenced in the body of the assessment report

Assessment Report Section	New or Amended Map IDs
Section 2 Watershed Characterization	Maps 2-1 to 2-26
Section 5 County of Dufferin Vulnerability Assessment	Maps 5-28 to 5-34
Section 7 City of Guelph Vulnerability Assessment	Maps 7-1 to 7-14, Maps 7-18 to 7-24, Maps 7-31 to 7-33
Section 8 Region of Waterloo Vulnerability Assessment	Maps 8-1 to 8-269
Section 9 Region of Halton Vulnerability Assessment	Maps 9-1 and 9-2
Section 11 County of Oxford Vulnerability Assessment	Maps 11-1, 11-2, 11-5, 11-6, 11-11, 11-14, and 11-17
Section 14 City of Brantford	Maps 14-1 to 14-5, 14-7, 14-8, 14-10, 14-11, 14-13, 14-14

Vulnerability Assessment	
Section 15 Six Nations Vulnerability Assessment	Maps 15-1, 15-3 to 15-8, 15-10, 15-11, 15-13, 15-14, 15-16, 15-17
Section 16 Haldimand County Vulnerability Assessment	Maps 16-9, 16-10, 16-13, 16-14, 16-17, 16-18, 16-21, 16-22
Section 18 Tier 2 Water Budget Results	Maps 18-1 to 18-4
Section 19 GGET Tier 3 Water Budget and Risk Assessment	Maps 19-1 to 19-11
Section 20 Waterloo Tier 3 Water Budget and Risk Assessment	Maps 20-1 to 20-12
Section 21 Whitemans Creek Tier 3 Water Budget and Risk Assessment	Maps 21-1 to 21-12
Section 22 Orangeville and Amaranth Tier 3 Water Budget and Risk Assessment	Map 22-1
Section 23 Halton Hills Tier 3 Water Budget and Risk Assessment	Map 23-1

SECTION 51 DOCUMENT AMENDMENTS

Amendments to this document, made under Ontario Regulation 287/07, Section 51 following approval on November 25, 2015, are summarized below:

DATE AMENDMENT POSTED	DESCRIPTION OF AMENDMENT
February 21, 2017	Identification of threats tables and associated text updated to reflect implementation of new provincial threats tool (www.swpip.ca)
	Improved colouring for Dunnville Intake Protection Zone Vulnerability maps (Maps 17-3, 17-9, 17-10, 17-11)
	Replaced Dunnville Emergency Intake IPZ-3 Percent Impervious Surfaces Map (3 of 3). (Map 17-23).
	Improved colouring for Waterloo North WHPA-E Inset 2 (Map 9-24)

EXECUTIVE SUMMARY

The Grand River Source Protection Area Assessment Report was submitted to the Ministry of the Environment on April 30, 2012, and received approval on August 16, 2012.

Following the 2012 approval of the Amended Assessment Report, further updates and new information were made to the Grand River Assessment Report. These updates were incorporated into an Updated Assessment Report which was posted for a 40-day public consultation period beginning in March 2015. The Updated Grand River Assessment Report was re-submitted to the Ministry of the Environment and Climate Change for their review and approval in June 26, 2015. Following the June 2015 submission, additional comments were addressed and the Updated Assessment Report was re-submitted for approval November 13, 2015. The Ministry of the Environment and Climate Change approved the Updated Grand River Assessment Report November 26, 2015. Additional updates were made to the Assessment Report following the November 2015 approval and included in the Draft Updated Grand River Assessment Report which was posted for a 35-day public consultation period from February 12 to March 18, 2019. Comments received during the public consultation period are summarized in **Appendix A**.

The Assessment Report summarizes the technical studies undertaken in the Grand River Source Protection Area (watershed) to delineate areas around municipal drinking water sources that are most vulnerable to contamination and overuse. Within these vulnerable areas, historical, existing and possible future land use activities were identified that could pose a threat to municipal water sources. Technical studies include a characterization of the human and physical geography of the watershed, a water budget and water quantity stress assessment, an assessment of groundwater and surface water vulnerability, a land use activity inventory, and an evaluation of existing water quality and quantity issues.

The Assessment Report provides an introduction to the Source Protection Planning process, and the roles and responsibilities of the Lake Erie Region Source Protection Committee, municipalities and conservation authorities. Section 2 of the Assessment Report provides a summary of the human and physical geography of the Grand River watershed area, section 3 **Part 1** summarizes **water quantity risk assessment and Part 2**, water quality threat assessment methodology. Sections 4 through 16 summarize the studies undertaken for the municipal residential drinking water systems in the Counties of Grey, Dufferin, Wellington, Perth, Oxford, Brant, Haldimand and the Cities of Brantford, Guelph, Hamilton, the Regional Municipalities of Waterloo and Halton, and Six Nations of the Grand River. These sections include the delineation of vulnerable areas (groundwater Wellhead Protection Areas and surface water Intake Protection Zones) and summaries of the threats assessment and issues evaluation in each vulnerable area. **Section 17 and 18 summarize the Tier 3 water budget framework and methods and Tier 2 water budget results, respectively. Sections 19 through 23 summarize the various Tier 3 studies undertaken for Guelph-Guelph/Eramosa, Region of Waterloo, Whitemans Creek Subwatershed, Orangeville, and Halton Hills.**

Sections **17-24** and **18-25** provide information on how climate change in the area may affect the results of the Assessment Report and how Great Lakes agreements were considered as part of the work undertaken. Section **19-26** summarizes the findings in the Assessment Report and provides an outline of the next steps in developing a source protection plan for the Grand River Source Protection Area.

The Grand River watershed area contains **46-50** municipal drinking water systems and one system that services a First Nations reserve.

One system is located in the County of Grey in the Grand River watershed. The community of Dundalk in the Township of Southgate has a groundwater system that serves approximately 1,700 people (~~2009~~2017).

Three systems are located in the County of Dufferin in the Grand River watershed in the communities of Waldemar, Grand Valley and Marsville, all of which are groundwater systems. Combined, the systems serve ~~over~~ 2,027 people (Waldemar 342, 2009; Grand Valley 1600, 2017; Marsville 85, 2017), the majority of which are in Grand Valley. The Town of Shelburne, located in the South Georgian Bay Lake Simcoe Source Protection Region has installed a ~~two~~ drinking water supply wells in the Township of Melancthon within the Grand River watershed. This well supplies water to the Town of Shelburne.

Wellington County has six municipal residential drinking water systems in the communities of Arthur, Drayton, Moorefield, Elora/Fergus, Rockwood and Hamilton Drive (North of Guelph). All of these systems rely on groundwater sources. In total, approximately 27,588 rely on municipal water supplies in Wellington County.

The City of Guelph Waterworks comprises of 21 groundwater wells, the Glen Collector, which collects shallow groundwater from the overburden, and an intake on the Eramosa River to help recharge the Glen Collector system. At a population of approximately 1345,000 (2017), Guelph is one of the largest cities in Canada to almost exclusively depend on groundwater for its potable water supply.

The Region of Waterloo operates a total of 24 municipal drinking water systems that serve a total population of approximately 556,600 (2017). The Integrated Urban System (IUS) – an interconnected network of wells, a surface water intake on the Grand River in Kitchener, reservoirs, and pumping stations – supplies water to approximately 517,030 people living in the communities of Cambridge, Kitchener, Waterloo, Elmira, New Hamburg and St. Jacobs (2017). This interconnected system is made of seven municipal drinking water systems. Fifteen (15) smaller water supply systems provide water to settlement areas in the townships. As well, the Region of Waterloo has ~~two~~three wellfields that are not currently active (~~Baden, Elmira and Lancaster~~). In all, groundwater is extracted from 130 wells throughout the Region and one surface water intake. Together these sources are capable of supplying approximately 279,000 cubic metres of water a day.

Perth County has one system in the Grand River watershed; Milverton is a groundwater system that serves 1,750 people. Oxford has three groundwater systems that serve the communities of Bright, Drumbo and Plattsville for a total population of approximately 32,4380 (2017). The City of Hamilton operates one groundwater system in the Grand River watershed. This system is known as the Lynden Communal Well System FDL01 and serves 380 people (2017).

The County of Brant has four municipal residential systems in the Grand River watershed area that draw from groundwater sources. These systems are the Airport, Mount Pleasant, St. George, and Paris (including the Bethel Road site) Well Supply systems. In total, these systems serve 18,683 residents (2017).

The City of Brantford has one large municipal residential drinking water system, known as the Holmedale Water Treatment Plant, which draws surface water from the Grand River. The system serves the 99,000 residents of the City of Brantford and draws an average annual of 31,446 m³/day (2017).

The Six Nations of the Grand River owns and operates the Ohsweken water system, which consists of one water treatment plant and one water distribution system. The plant has a design capacity of 1,040 m³/day and serves a population of approximately 2,000. The intake for this system draws water from the Grand River at Ohsweken just upstream of the Chiefswood Road crossing.

One municipal residential drinking water system is located in the portion of Haldimand County that falls in the Grand River watershed area. The Dunnville water system draws water from Lake Erie and serves 5,729 residents. The Dunnville water system has an emergency in-take located in the Grand River.

The findings of the Tier 2 Water Budget and Risk Assessment studies (AquaResource, 2009b) indicate that ten municipal water systems require additional Tier 3 Water Quantity Risk Assessments: Elora/Fergus in the Township of Wellington Centre; Rockwood and Hamilton Drive in the Township of Guelph/Eramosa; the City of Guelph system including the Eramosa intake; Elmira, West Montrose, Conestogo Plains, and the Integrated Urban System in the Regional Municipality of Waterloo; and Bright in the County of Oxford. The subwatersheds within which these water supplies ~~fall~~ were assessed as having either the potential for moderate or significant stress under current or future conditions. ~~At this time Tier 3 studies are complete for Guelph, Rockwood and Hamilton Drive, Region of Waterloo rural systems (Elmira, West Montrose and Conestogo Plains), Region of Waterloo Integrated Urban System and Whitemans Creek (Bright & Bethel). Results from these Tier 3 Risk Assessments will be included in a future update to the Grand River Assessment Report. The Tier 3 study for the Fergus/Elora system located in the Township of Centre Wellington is underway.~~

Within the Grand River watershed, Tier 3 studies have been completed for municipal drinking water systems within the City of Guelph, Guelph/Eramosa Township, the Region of Waterloo, the Bethel Wellfield in the County of Brant, and the Bright Wellfield in Oxford County. Further information on these studies is found in Chapters 19 (City of Guelph and Guelph/Eramosa Township (GGET)), 20 (Region of Waterloo), and 21 (Whitemans Creek). The Centre Wellington Scoped Tier 3 Assessment is currently underway, with an update to the assessment report once the study is complete.

The vulnerable areas in the GGET Tier 3 Assessment are represented by four WHPA-Qs (Groundwater Vulnerable Area) and an IPZ-Q (Surface Water Vulnerable Area). The largest WHPA-Q (WHPA-Q-A) is circular, with a diameter of approximately 20 km and extends around the City of Guelph and into the Township of Guelph/Eramosa. Significant threats to drinking water quantity were identified as a result of assigning a *Significant* Risk Level to the WHPA-Q-A and IPZ-Q.

The vulnerable areas in the Waterloo Tier 3 Assessment are represented by four WHPA-Q1s. The consumptive water users and potential reductions to groundwater recharge within the WHPA-Q1s were not classified as Significant or Moderate water quantity threats, therefore no water quantity threats were identified within the WHPA-Q1s.

The Whitemans Creek Tier 3 Study evaluated the risk of water quantity impacts to the Bright Well Field in Oxford County and to the Bethel Well Field in the County of Brant, given planned growth (future land use and allocated water demand) and variable climate (average and drought conditions). The WHPA-Q for the Bright Well Field is a circle of 100 m radius around each production well, with a “low” risk level for water quantity impacts. The WHPA-Q for the Bethel Well Field is a 6 km² area with a “significant” risk level for water quantity impacts.

Tier 3 Assessments were completed for the Town of Halton Hills and the Town of Orangeville. Although the Town of Halton Hills and the Town of Orangeville do not have wells located within the Grand River Watershed, the Wellhead Protection Areas for Quantity extends into the Grand River Source Protection Area.

Threats relating to excavation activities below the water table that breach the confining layer protecting an aquifer for drinking water source are not currently identified as activities that may be a threat to drinking water. The Lake Erie Region Source Protection Committee has urged the Minister of the Environment and the Director of the Source Protection Programs Branch to add excavation that

breaches the aquitard protecting a municipal drinking water supply aquifer to the list of activities that are prescribed drinking water threats. The letters sent to the Ministry as well as Ministry's response are attached in **Appendix C**.

The results of the technical studies have been used to develop policies to protect sources of municipal drinking water. These policies have been developed by municipalities, conservation authorities, property and business owners, farmers, industry, health officials, community groups and others working together to develop a fair, practical and implementable Source Protection Plan. Public input and consultation has played a significant role throughout the process.

Note: In June 2018, the Ministry of the Environment and Climate Change changed its name to the Ministry of the Environment, Conservation and Parks. In June 2014, the Ministry of Natural Resources changed its name to the Ministry of Natural Resources and Forestry, and the Ministry of the Environment changed its name to the Ministry of the Environment and Climate Change. The new and former names of both Ministries are used within this document.

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1.0 INTRODUCTION

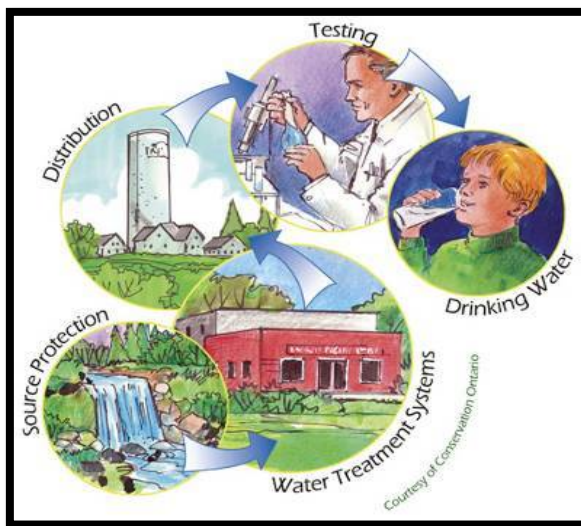
Following the public inquiry into the Walkerton drinking water crisis in May 2000, Justice Dennis O'Connor released a report in 2002 containing 121 recommendations for the protection of drinking water in Ontario. Since the release of the recommendations, the Government of Ontario has introduced legislation to safeguard drinking water from the source to the tap, including the *Clean Water Act* in 2006. The Act provides a framework for the development and implementation of local, watershed-based source protection plans, and is intended to implement the drinking water source protection recommendations made by Justice Dennis O'Connor in Part II of the Walkerton Inquiry Report. The Act came into effect in July 2007, along with the first five associated regulations.

The intent of the *Clean Water Act, 2006* is to ensure that communities are able to protect their municipal drinking water supplies now and in the future from overuse and contamination. It sets out a risk-based process on a watershed basis to identify vulnerable areas and associated drinking water threats and issues. It requires the development of policies and programs to reduce or eliminate the risk posed by significant threats to sources of municipal drinking water through science-based source protection plans.

Source Protection Committees are working in partnership with municipalities, Conservation Authorities, water users, property owners, the Ontario Ministry of the Environment, Conservation and Parks (MECP), Ministry of Natural Resources and Forestry (MNRF), and other stakeholders to facilitate the update of local, science based source protection plans.

The *Clean Water Act, 2006* and Drinking Water Source Protection are one component of a multi-barrier approach to protecting drinking water supplies in Ontario. The five steps in the multi-barrier approach include:

- **Source water protection**
- Adequate treatment
- Secure distribution system
- Monitoring and warning systems
- Well thought-out responses to adverse conditions



After the Walkerton Inquiry, the Government of Ontario enacted the *Safe Drinking Water Act, 2002* which provides new requirements and rules for the treatment, distribution and testing of municipal drinking water supplies. Together, the *Clean Water Act, 2006* and *Safe Drinking Water Act, 2002* along with their associated regulations, provide the legislative and regulatory framework to implement the multi-barrier approach to municipal drinking water protection in Ontario.

The protection of municipal drinking water supplies through the *Clean Water Act, 2006* is one piece of a much broader environmental protection framework in Ontario. Water resources in Ontario are protected directly and indirectly through the federal and provincial governments, municipalities, conservation authorities and public health units. These agencies are responsible for protecting and improving water quality, water quantity and aquatic habitats, providing land use planning and development rules to ensure that water resources are not negatively affected, providing flood management and responses to low water availability, and many others. For more information on how water resources are protected in Ontario, please visit www.ontario.ca/page/ministry-environment-conservation-parks or call 1-800-565-4923.

1.1 Source Protection Planning Process

The key objectives of this process are the completion of science-based Assessment Reports that identify the risks to municipal drinking water sources, and locally-developed Source Protection Plans that put policies in place to reduce the risks to protect current and future sources of drinking water.

Since 2005, municipalities and conservation authorities have been undertaking studies to delineate areas around municipal drinking water sources that are most vulnerable to contamination and overuse. Within these vulnerable areas, technical studies have identified historical, existing and possible future land use activities that are or could pose a threat to municipal water sources. This Assessment Report is a compilation of the findings of the technical studies undertaken in the Grand River Source Protection Area (watershed area).

The Amended Assessment Report was submitted to the Ministry of the Environment for approval on April 30, 2012. Opportunities for public review and input have been available on the Draft Assessment Report (August – September 2010), the Proposed Assessment Report (October – November 2010) and again on the Draft Amended Assessment Report (April 15 to May 21, 2011). The Amended Assessment Report was officially approved by the Ministry of the Environment on August 16, 2012.

In 2014, further studies were undertaken to better delineate the wellhead protection areas for wells located in the Bethel wellfield and a new section characterizing a municipal drinking water system serving the Town of Shelburne but located in the Township of Melancthon was added. The Updated Assessment Report was posted for a 40-day public consultation period starting on March 16, 2015. The comments and feedback received during the comment period were reviewed and considered by the Source Protection Committee. The Grand River Source Protection Authority submitted the Updated Grand River Assessment Report to the Minister on July 6, 2015.

Following the July 2015 submission, additional comments were addressed and the Assessment Report was re-submitted for approval on November 13, 2015. The Ministry of the Environment and Climate Change approved the Updated Grand River Assessment Report on November 26, 2015.

Updates, including new Wellhead Protection Areas (WHPA), have since been added to the Approved Grand River Assessment Report.

The Source Protection Plan is a document that contains policies to protect sources of drinking water against threats identified in the Assessment Report. The Plan sets out:

- how the risks posed by drinking water threats will be reduced or eliminated;
- policy, threat and issues monitoring programs;
- who is responsible for taking action;
- timelines for implementing the policies and programs; and
- how progress will be measured.

The task of plan development involved municipalities, conservation authorities, property and business owners, farmers, industry, health officials, community groups and others working together to develop a fair, practical and implementable Source Protection Plan. Public input and consultation played a significant role throughout the process.

Following Source Protection Plan approval, annual progress reports on implementation are required. Implementation of the Source Protection Plan is led by municipalities and provincial agencies. In some cases, conservation authorities, public health units, or other organizations may be involved in implementing policies in the Source Protection Plans. The implementers use a range of voluntary and regulatory programs and tools, including outreach and education; incentive programs; land use planning (zoning by-laws, and Official Plans); new or amended provincial instruments; Risk Management Plans; and prohibition. Actions to reduce the risk posed by activities found to be significant threats are mandatory, since the *Clean Water Act, 2006* requires that all identified significant threats cease to be significant.

1.2 Source Protection Authorities and Regions

The province has organized the Source Protection Program using watershed boundaries, rather than municipal or other jurisdictions. The watershed boundary is the most appropriate scale for water management, since both groundwater and surface water flow across political boundaries. For Source Protection planning purposes, the watershed is referred to as a Source Protection Area under the *Clean Water Act, 2006*. The Grand River watershed is called the Grand River Source Protection Area. Similarly, Conservation Authorities are referred to as Source Protection Authorities under the *Clean Water Act, 2006* and are responsible for facilitating and supporting the development and update of source protection plans.

For the purposes of source protection, the Grand River Source Protection Authority is partnered with the Catfish Creek Source Protection Authority, Kettle Creek Source Protection Authority and Long Point Region Source Protection Authority to create the Lake Erie Source Protection Region. The Lake Erie Source Protection Region is one of 19 Regions established across the province. The Grand River Source Protection Authority acts as the lead Source Protection Authority in the Lake Erie Region.

1.3 Source Protection Committee

In the Grand River Source Protection Area, the Source Protection Planning process is being led by a multi-stakeholder steering committee called the Lake Erie Region Source Protection Committee. The Committee was formed in November 2007, and met monthly until the Proposed Grand River Source Protection Plan was submitted to the Ministry of the Environment in January 2013. Since then the Committee has continued to meet on a quarterly basis. The Committee is responsible for directing the development and update of the Assessment Reports and Source Protection Plans for each of the four Source Protection Areas in the Lake Erie Region. The list of current and past members is summarized in **Table 1-1**.

Name	Seat Held	Appointment	Joined	Resigned
Wendy Wright-Cascaden	Chair	Minister of the Environment and Climate Change	Nov, 2016	-
Wendy Wright-Cascaden	Acting Chair	Lake Erie Region Source Protection Committee	Sep, 2015	Nov, 2016

Name	Seat Held	Appointment	Joined	Resigned
Craig Ashbaugh	Chair	Minister of the Environment	Nov, 2007	Jul, 2015
Brad Carberry	Agriculture	Agricultural Community	Aug, 2017	-
Peter Busatto	Municipal	City of Guelph	Nov, 2012	Sep, 2013
Marguerite Ceschi-Smith	Public Interest	Grand River Source Protection Authority	Nov, 2007	Sep, 2014
Howard Cornwell	Municipal	Perth, Oxford	Nov, 2007	-
Alan Dale	Public Interest	Grand River Source Protection Authority	Jan, 2012	-
Paul Emerson	Municipal	Brant, Brantford, Hamilton	Sep, 2018	-
Paul General	First Nations	Six Nations of the Grand River	Nov, 2007	-
Mark Goldberg	Public Interest	Grand River Source Protection Authority	Nov, 2007	Nov, 2011
Roy Haggart	Municipal	Brant, Brantford, Hamilton	Nov, 2007	Aug 2018
John Harrison	Public Interest	Grand River Source Protection Authority	Nov, 2007	Jun, 2012
Andrew Henry	Public Interest	Elgin Area Primary Water Board	Nov, 2007	-
Carl Hill	First Nations	Six Nations of the Grand River	Feb, 2012	Mar, 2012
Darryl Hill	First Nations	Six Nations of the Grand River	Apr, 2012	Nov, 2015
Carl Hill	First Nations	Six Nations of the Grand River	May, 2016	-
Eric Hodgins	Municipal	Grand River Source Protection Authority	May, 2016	-
Ken Hunsberger	Agriculture	Agricultural Community	Nov, 2007	-
Cathie Jamieson	First Nations	Mississaugas of the New Credit	Sep, 2018	-
Robert E. Johnson	First Nations	Six Nations of the Grand River	Mar, 2011	Apr, 2011
Casey Jonathan	First Nations	Mississaugas of the New Credit	Feb, 2016	Dec, 2017
Jim Kirchin	Public Interest	Grand River Source Protection Authority	Feb, 2015	-
Ralph Krueger	Business and Industry	Grand River Source Protection Authority	Nov, 2007	-
Clynt King	First Nations	Mississaugas of the New Credit	Mar, 2011	Dec, 2015
Bryan LaForme	First Nations	Mississaugas of the New Credit	Nov, 2007	Mar, 2011
Janet Laird	Municipal	City of Guelph	Nov, 2007	Nov, 2012
Ian MacDonald	Business and Industry	Grand River Source Protection Authority	Nov, 2007	-
Chris Martin	First Nations	Six Nations of the Grand River	Nov, 2007	Nov, 2010
George Montour	First Nations	Six Nations of the Grand River	Apr, 2011	Jan, 2012
Dale Murray	Municipal	Grey, Dufferin, Halton, Wellington	Nov, 2007	Jul, 2016
Thomas Nevills	Public Interest	Grand River Source Protection Authority	May, 2017	-
Jim Oliver	Municipal	Haldimand, Norfolk	Nov, 2007	Jun, 2018
David Parker	Agriculture	Agricultural Community	Nov, 2007	Mar, 2016
Lloyd Perrin	Municipal	Elgin, Middlesex, London	Nov, 2007	-
Geoff Rae	Public Interest	Nanticoke Grand Valley Water Supply	Nov, 2007	Jul, 2010
Peter Rider	Municipal	Guelph	Oct, 2013	-
Phil Wilson	Public Interest	Nanticoke Grand Valley Water Supply	Nov, 2007	-
Thomas Schmidt	Municipal	Waterloo Region	Nov, 2007	Mar, 2016
George Schneider	Aggregate Industry	Ontario Stone, Sand & Gravel Assoc.	Oct, 2011	-
Richard Seibel	Aggregate Industry	Ontario Stone, Sand & Gravel Assoc.	Nov, 2007	Aug, 2011
John Sepulis	Municipal	Grey, Dufferin, Halton, Wellington	Nov, 2017	-
Bill Strauss	Public Interest	Grand River Source Protection Authority	Jul, 2012	-
Ryan Taylor	Municipal	Haldimand, Norfolk	Mar, 2019	-
Bill Ungar	Business and Industry	Grand River Source Protection Authority	Nov, 2007	-
Mark Wales	Agriculture	Agricultural Community	Nov, 2007	-
Don Woolcott	Public Interest	Grand River Source Protection Authority	Nov, 2007	-
Wendy Wright-Cascaden	Public Interest	Grand River Source Protection Authority	Nov, 2007	Sep, 2015

Message from the Committee

The overall objective of the Lake Erie Region Source Protection Committee, in partnership with local communities and the Ontario government, is to direct the development of source protection plans that protect the quality and quantity of present and future sources of municipal drinking water in the Lake Erie Source Protection Region. We will work with others to gather technical and traditional (local and aboriginal) knowledge on which well-informed, consensus-based decisions can be made in an open and consultative manner. In developing the Source Protection Plan, the Lake Erie Region Source Protection Committee intends to propose policies that are environmentally protective, effective, economical, and fair to local communities.

The committee will strive to develop policies that are practical and implementable, and that focus limited resources on areas that net the greatest benefit, while recognizing that the plan must address significant threats so that they cease to be significant. Where possible, the committee will strive to develop policies and programs that also provide a benefit to broader protection of water quality and quantity. The process to assess drinking water threats and issues will be based on the best available science, and where there is uncertainty, we will strive to follow the precautionary approach.

In December 2008, the Committee submitted to the Minister of the Environment their Terms of Reference for the Grand River Source Protection Area Assessment Report and Source Protection Plan. The Terms of Reference sets out the work plan for completing both the Assessment Report and Source Protection Plan, and received Ministerial approval on July 13, 2009. A copy of the Grand River Source Protection Area Terms of Reference can be found at: www.sourcewater.ca.

1.4 Financial Assistance

Section 97 of the *Clean Water Act, 2006* establishes the Ontario Drinking Water Stewardship Program. The purpose of the program is to provide financial assistance to those whose activities and properties may be affected by the implementation of the Source Protection Plan. The program also provides for outreach and education programs to raise awareness of the importance and opportunities for individuals to take actions to protect sources of drinking water. Ontario Regulation 287/07 (General) further clarifies the details of the Ontario Drinking Water Stewardship Program.

The program received funding from 2008 until 2014. By way of committee resolutions and letters to the Ministry, the Lake Erie Source Protection Committee requested that the Province of Ontario continue to support funding of the Ontario Drinking Water Stewardship Program beyond 2014. The Joint Advisory Committee (JAC) continues to encourage the Province to re-establish and rejuvenate the stewardship program to support local source protection plan implementation. The committee believes ongoing funding is needed to provide financial assistance to property owners affected by new policies and risk reduction strategies as a result of the approved Source Protection Plan.

1.5 Framework of the Assessment Report

The Grand River Source Protection Area Assessment Report was completed in compliance with Ontario Regulation 287/07 (General) under the *Clean Water Act, 2006* which sets out the minimum requirements for Assessment Reports. In addition, the technical work summarized in this Assessment Report was completed in conformance with the *Technical Rules: Assessment Report* under O. Reg. 287/07. The technical work was undertaken by municipalities and the Grand River Conservation Authority. Funding to complete the technical studies for the Assessment Report was provided by the Province of Ontario.

Within the Grand River Source Protection Area (SPA), there are 39 upper and lower tier municipalities and two First Nations communities. At present, there are 46 municipal residential drinking water systems, including two integrated groundwater/inland river systems and one inland river system. In addition, one Lake Erie intake located outside of the source protection area (Nanticoke) and one pipeline system from Lake Ontario also supply water to residents in the Grand River SPA.

The *Clean Water Act, 2006* focuses on the protection of municipal drinking water supplies; however, the Act allows for other water systems to be considered, including clusters of private wells, communal systems, and other non-municipal supplies. Only municipalities within which the supplies are located or the Minister of the Environment, Conservation and Parks, have the power to add additional non-municipal systems. To date, no municipalities in the Grand River Source Protection Area have designated non-municipal drinking water supplies under the *Clean Water Act, 2006*. The Minister of the Environment included the Ohsweken Water Treatment Plant: a non-municipal system that serves a major residential development on the reserve of the Six Nations of the Grand River.

The technical studies summarized in this Assessment Report start with information at the watershed scale, and then move to the municipal drinking water system scale. The document is organized into the following sections: Watershed Characterization, Water Quantity Risk Assessment, Water Quality Threat Assessment Methodology, Water Quality Risk Assessment (including groundwater vulnerability, and sections dedicated to each municipality's Wellhead Protection Areas and Intake Protection Zones); State of Climate Change Research; Great Lakes Considerations; and Conclusions.

The descriptions of the technical work provided in the Assessment Report are summaries of more detailed technical reports. In order to find more detail on any of the components of the Assessment Report, the reader is encouraged to view the technical studies and background reports available online in full at www.sourcewater.ca.

1.6 Continuous Improvement

The findings of this Assessment Report are based on the best available information. It is recognized that new information that informs the findings of this Assessment Report will become available in the future. Beyond the completion of this Assessment Report, municipalities and conservation authorities will continue to refine and improve the findings, and attempt to address the data gaps documented in the Report. As new or improved information becomes available, the relevant components of the Assessment Report will be amended as required. Opportunities for input and review of updated Assessment Reports will be made available to those affected by the proposed changes.

1.7 Public Consultation

Throughout the development of the Grand River Assessment Report there have been multiple periods of public consultation. During each consultation period members of the public, municipalities and other interested bodies were invited to review the Assessment Report documents. These documents were made available via the www.sourcewater.ca website and hard copies were also available at the conservation authority and municipal administrative offices. A series of public meetings were also held during public consultation periods. **Table 1-2** below provides details regarding each of the public consultation periods held regarding the Grand River Assessment Report.

Document / Notice	Notification Date:	Consultation Period:	Public Meeting Date(s)	Meeting Location
Draft Assessment Report	July 16, 2010	July 16, 2010 – Sept 24, 2010	September 8, 2010	Grand Valley Community Centre
			September 9, 2010	Waterloo Region Emergency Services Training and Research Complex
			September 13, 2010	Grand River Conservation Authority
			September 14, 2010	Italian Canadian Club, Guelph
			September 15, 2010	Tranquility Hall, Brantford
Proposed Assessment Report	Nov 9, 2010	Nov 5, 2010 – Dec 6, 2010	N/A *	N/A *
Draft Amended Assessment Report	Apr 18, 2011	Apr 15, 2011– May 21, 2011	N/A *	N/A *
Updated Assessment Report:	March 16, 2015	March 16, 2015 - April 24, 2015	March 31, 2015	Amaranth Recreation Hall
			March 31, 2015	Fergus SportsPlex
			April 8, 2015	T.J Costini Community Centre, Brantford
			April 9, 2015	City Hall, Guelph
			April 9, 2015	Waterloo Region Emergency Services Training and Research Complex
			April 15, 2015	Grand River Conservation Authority
			April 15, 2015	Dunnville Optimist Hall
April 16, 2015	County of Brant SportsPlex			
Draft Updated Assessment Report (Grey, Hamilton, Brant, S.34)	Feb 12, 2019	February 12 – March 18, 2019	February 21, 2019	Brant Sports Complex, Paris
Draft Updated Assessment Report ("bundled" S.34)	April 8, 2019	April 8 – May 21, 2019	April 15, 2019	Plattsville Lions Hall, Plattsville

* no public meeting required – comments received were appended to the submission package

During each period of public consultation members of the public, municipalities or other interested bodies were able to submit comments to the Source Protection Committee. The Committee in turn, considered these comments following each period of public consultation.

The Draft Updated Assessment Report will be posted for a 44-day public consultation period between April 8 and May 21, 2019. The public is invited to review the Assessment Report on www.sourcewater.ca, during the public open house, or at the Grand River Region Conservation Authority where hard copies will be made available.

The public can submit comments on the Assessment Report at public open houses, by email (comments@sourcewater.ca), or by regular mail to:

Martin Keller, M.Sc.
Source Protection Program Manager
Lake Erie Source Protection Region

c/o Grand River Conservation Authority
400 Clyde Road, Box 729, Cambridge ON N1R 5W6

All comments received during this comment period will be forwarded to the Ontario Ministry of the Environment, Conservation and Parks with the submission of the Grand River Assessment Report.

Comments received by the Source Protection Committee during the period of public consultation from February 12 to March 18, 2019, are included in **Appendix A**.

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