Final Summary

A Summary of the Assessment of Water Resources to Support a Review of Ontario's Water Quanitity Management Framework

March 2019

Prepared for:

Government of Ontario
Ministry of the Environment, Conservation and Parks
Environmental Monitoring and Reporting Branch
125 Resource Road
Etobicoke, ON M9P 3V6

Prepared by:

BluMetric Environmental Inc.
Unit 3B, 209 Fredrick Street
Kitchener, ON N2H 2M7

Project Number: 200192-00
Submission Date: May 19, 2020

Table of Contents

This is a summary of our report titled "Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework, March 2019". You can find more detailed information in the report.

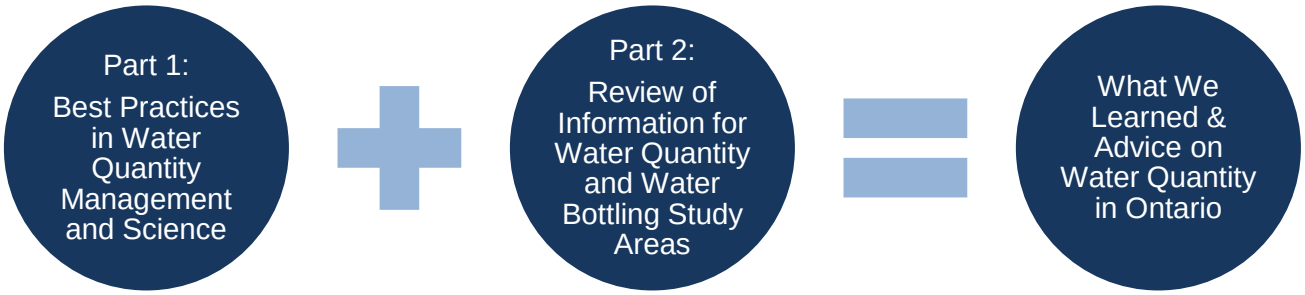
BluMetric Environmental Inc. wrote this summary with the support of LURA Consulting for the purpose of meeting plain language requirements.

Overview

We, BluMetric, were hired by the Government of Ontario to review how water quantity is managed. Water quantity is the amount of water available for use – for example, in our homes or for industry. There were two parts to our review.

In **Part 1**, we explored the best methods used by scientists to study water quantity. We also reviewed how other governments manage water quantity.

In **Part 2**, we looked at 17 areas in Ontario to better understand water quantity. We looked at seven of these study areas to better understand water quantity and sustainability. In the other ten locations, we studied the impacts of water bottling on the sustainability of local water resources. We looked at existing data, reports and studies. We met with some provincial and local water managers and talked to local water managers in the study areas. All of these tasks helped shape **our conclusions and advice** for Ontario.



Our review found that in general, water quantity in Ontario is sustainable today. There are some small exceptions in areas with high water use in the summer. These exceptions are locally specific. Some flexibility in how water is managed may be needed for water quantity to remain sustainable in the future. For example, in some places, summer (warm temperatures and lower rainfall) and drought have an effect on the sustainability of water. Here the sustainability is impacted by the amount of water used for irrigating crops or by the local geology. We also found that the amount of water taken for water bottling does not affect the sustainability of water resources locally or in the surrounding areas.

Our review of the best practices in science and water quantity management showed that Ontario manages water quantity well, but some things could improve. Changes to how data are collected, organized, and shared will improve future water quantity studies in Ontario. Improving existing tools and providing more guidance to water managers will help to manage water even better. Water quantity management could be improved if the Government developed a plan to help municipalities manage water quantity across municipal boundaries.

This summary shares the highlights of:

- How we did our review;
- What affects water quantity in some areas of Ontario;
- Whether water quantity in Ontario is sustainable;
- What happens to local water quantity when water is taken for water bottling; and
- Our advice to improve the management of water quantity in Ontario.

Water resources are **sustainable** if there is enough water available that can be used to meet our needs now and in the future without harming the environment.

How We Did Our Review

Part 1 – Finding Out What Works Best

We looked at many scientific studies, reports, and sources of information. This is called a '**best practices review'**. This review identified the best ways for scientists to understand and manage water quantity in different environments. It also showed how other governments manage water quantity and use. The table below includes some important questions that we explored during our best practices review.

	Best Practices in Water Quantity Science	**Best Practices for Water Management**
What We Wanted to Know	• How do you know if there is enough water for everyone who needs it? • How do you determine how much water the environment needs? • How do you know if water resources are sustainable for the future? • How do you assess the effects of population growth on water availability? • How do you assess the effect of climate change on water availability?	• How do you make sure there is enough water for the environment and everyone else? • How do you best manage water now, even when there is drought, and plan for the future with changing climate, population and land use? • How do you manage areas with many takers and conflicting priorities around water? • What are the best ways to collect, share and organize data? • How can stakeholders be involved in water management?
What We Did to Find Out	We reviewed many recent sources of information on the best approaches to answer these questions.	We looked at how 21 other governments manage water. Their approaches may be of interest to Ontario. We looked at five governments in more detail. We conducted three workshops with Ontario's local water managers.

Part 2 – Review of Ontario's Water Quantity

We used an **evidence-based approach** for our review. This means that we formed opinions by looking at existing data and information. We considered real measured data to be the most important to inform our opinions. Most of the information we reviewed covered a few decades of data. Based on what we learned from the best practices review in Part 1 and the amount of data reviewed, we were able to make conclusions on the sustainability of water quantity in the study areas.

Nobody owns Ontario's water. We need to share it with each other and the ecosystem.

The Government of Ontario is responsible for managing Ontario's water so that it is there for everyone to use now and in the future.

As mentioned, we did not collect any new data. Because of this, we made sure that we made our conclusions based on:

- Using the right kind of data to answer our questions;
- Having enough data;
- Using studies and reports that used data correctly;
- Assumptions that made sense for our review; and
- Ensuring that the data, information, and conclusion in one report were similar to others for the area.

Water Quantity Study Areas – We looked at seven areas of interest in Ontario from a water quantity perspective.

The water quantity areas included:

1. Guelph-Wellington County
2. Orangeville
3. Norfolk Sand Plain
4. Innisfil Creek
5. Whitemans Creek
6. Quinte
7. Chapleau

The government chose these water quantity areas because:

- They have a variety of different stressors, geology, and climates;
- Six of the areas have known water quantity issues; and
- One area is in northern Ontario, has the smallest population and is not experiencing stress. There are three First Nation communities in the area

The table below outlines what we wanted to know about water quantity in each study area, and where we looked for that information.

What We Wanted to Know	Where We Looked

• What are the water resources in the area?
• Is there current stress on water quantity related to climate, population and land use?
• What does water usage and availability look like for this area?
• What is the impact of water usage on the environment?
• What is the sustainability of water quantity for the future based on changes in climate, population, and land use?
• What are the approaches and challenges related to water management?
• Are there any data gaps?
	• Drinking Water Source Protection water budgets
	• Data and reports from:
	  ○ Ontario's Provincial Groundwater Monitoring Network
	  ○ Ontario's permit to take water program
	  ○ Ontario Low Water Response program
	• Well records, studies, and reports that have water levels and water use data
	• Other reports related to water quantity and flow

We held workshops with some of Ontario's water managers, and interviewed water managers from the water quantity study areas to ask:

- How stresses on water quantity impacted their decisions about how to manage water in their community; and
- If anything was missing from the information we reviewed.

Water Bottling Locations – We looked at ten of Ontario's fifteen approved locations for water bottling that take groundwater. These ten locations are actively taking enough water to need a **permit to take water** from the Government. We wanted to understand if water bottling affects local surface water and groundwater. We also wanted to find out if water bottling impacts other people using the local water resource and its sustainability. The ten locations included:

1. Gott Enterprises Inc. (Alnwick/Haldimand)
2. Gott Enterprises Inc. (Amaranth)
3. Gott Enterprises Inc. (Grey Highlands)
4. Aquaterra Corp. Ltd. (Cataract Site)
5. Gold Mountain Springs Inc.
6. Robins Holdings Inc.
7. Savarin Springs Inc.
8. Aquaterra Corp. Ltd. (Hillsburgh)
9. Nestle Canada Inc. (Aberfoyle)
10. Nestle Canada Inc. (Erin)

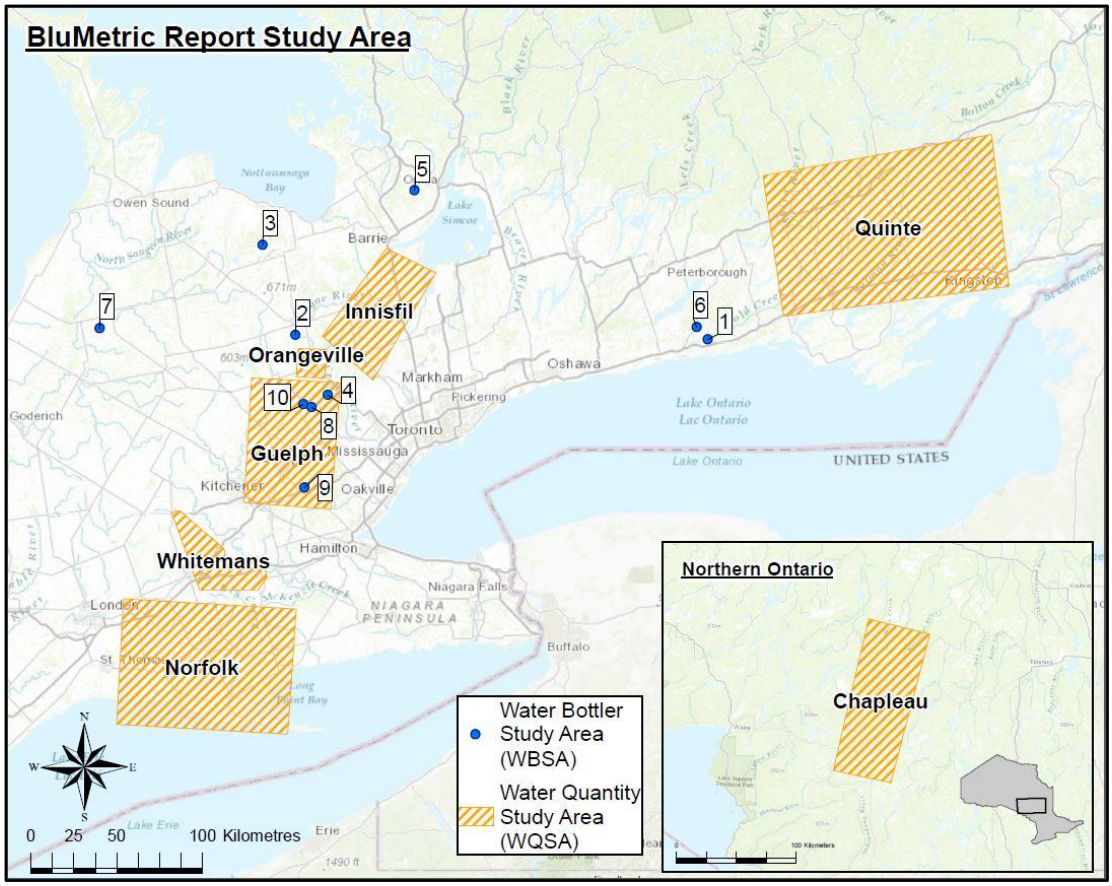
To study the ten water bottling locations, we reviewed:

- The Ministry of the Environment, Conservation and Parks files about the location which included:
  - Permit to take water history and environmental studies; and
  - Water quantity and environmental monitoring data.
- Regional and municipal studies on water quantity.

With a few exceptions (like raising farm animals and fire fighting) anyone who takes more than 50,000L per day of water needs a **permit to take water.**

When we use the word "permit", we mean a permit to take water.

The map below shows the 17 areas. The yellow areas represent the seven water quantity study areas. Blue dots represent the ten water bottling locations. As the map shows, the ten water bottling locations are much smaller than the seven water quantity study areas.



What We Learned - Water Quantity in Ontario Now, and the Future

We have determined the sustainability of water quantity in the seven study areas. We used what we learned about the best practices of water quantity science when we reviewed each area's information. This helped us understand how population growth, climate change, and land use effect water quantity. The best practices of water management review also helped us make our evidence-based conclusions. The information we reviewed included:

- The amount of water taken compared to the permitted amount to be taken;
- Water levels over time; and
- How much water moves in a creek or river on average.

The following is an overall summary of the sustainability of Ontario's water, how water is used in the study areas, and the sustainability of water quantity for each study area. We recommend reading about ***How Water is Used in the Study Areas*** before reading the area-specific summaries. Some study areas had more information than others. If we did not explain the climate, population, or land use impacts for an area, it is because it is not a significant concern.

Our Water Now

Based on our review, we found that Ontario's groundwater and surface water resources are sustainable with the climate and water use conditions at this time. There are some exceptions related to periods without rain, seasonal water usage, and naturally limited groundwater supply.

The Future of Our Water

Based on what we know about the changes in population, climate, and land use, some flexibility in how water is managed may be needed to make sure there is enough water to meet the needs of the environment and future generations.

Overall Sustainability of Ontario's Water

We found that Ontario's groundwater and surface water in the study areas is sustainable at this time. In the future, population growth and related growth in water demand and climate change may bring some uncertainty in some locations. There are a few small exceptions that exist in some cases.

Exceptions related to groundwater include:

- Areas using shallow groundwater (Quinte, Norfolk Sand Plain, and southern Whitemans Creek). Shallow groundwater is sensitive to drought.
- In the future, sustainability of some municipal water supply systems is uncertain because of pressures from increases in population, changes in climate and land use (Orangeville and Guelph). Sustainability of these systems is addressed through the Source Protection Program.

Exceptions related to surface water include:

- Areas using water from creeks to water crops (Whitemans Creek, Norfolk Sand Plain, and Innisfil). Farmers use this water because it is easier to access than groundwater. The sustainability challenges are related to summer or drought.

No one really knows what the future will be like, however, based on best practices, modeling and professional judgement, we have made some educated conclusions. **Overall, we are confident in our conclusions** based on the information reviewed.

Water is usually taken from the ground using wells, and from lakes, rivers, creeks, and streams, called surface water.

Rain is good for water quantity because when there is enough, it trickles down into the earth and restores our groundwater resources, waters our plants, and keeps our streams, rivers, and creeks flowing.

How Water is Used in the Study Areas

We looked at how water is used in the study areas. We compared how much water is actually taken to the amount permitted to be taken.

Water bottling is less than 1% of the total permitted water taken in Ontario.

The most common uses for permitted water takings are:

- **Municipal** – Water is taken for use by people, mostly in towns and cities.
- **Commercial** – This is water used by businesses. Water bottling fits under this category. Some other users are golf courses, aquaculture, and beverage companies like craft breweries.
- **Agriculture** – This is water taken by farmers to water crops. This does not include raising farm animals.
- **Industrial** – This water is taken for use by industries. Water is used for cooling in manufacturing and food processing plants and used for aggregate/ gravel washing.
- **Dewatering** – This relates to water that is removed from a hole created by construction activities, pits, and quarries.
- **Other** – This is water taken for different miscellaneous uses. It includes institutions like hospitals, schools, and recreational facilities. It includes water used for dams and pumping and treating contaminated water.

<u>Units</u>
1 cubic metre = 1000 L
1 million cubic metres = 1 billion L

<u>Example</u>
An Average Home Swimming Pool
100 cubic metres = 100,000 L

The graphs for each water quantity study area shows how the reported water taken was used in 2017. Not all categories of water taking occur in each area.

To help with comparing volumes of water between study areas and water bottling locations, all volumes are shown in million cubic metres.

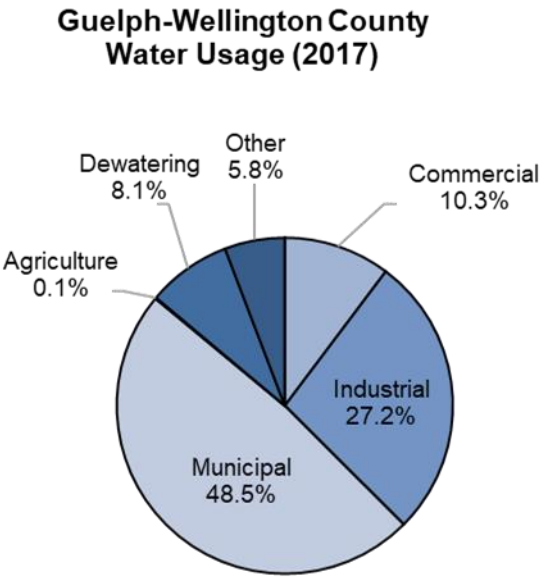
The Guelph-Wellington County Study Area

About the Guelph-Wellington County Study Area

- Includes the City of Guelph and 13 smaller communities including Erin, Hillsburgh, Fergus, Elora, Acton, Rockwood, Eden Mills, Everton, Aberfoyle, Morriston, Maryhill, Marden and Ennotville.
- Uses both groundwater and surface water for homes, businesses, industries, and farming.
- A lot of evidence-based information was available for review.
- A growing population and climate change are the main stresses on water quantity.

Water Use

The amount of reported water taken in 2017 was about 74 million cubic metres. This is 17% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by use. Almost half of the reported water taken in 2017 was for municipal use.



What We Found - Groundwater

- Groundwater quantity is sustainable at this time for most of the area. This includes the amount of water currently pumped from all municipal wells. This is based on measured groundwater levels and the Drinking Water Source Protection water budget for this area.
- Increases in population, changes in climate, and changing land use will put pressure on water quantity. As a result, the Drinking Water Source Protection water budgets predicts that the sustainability of future municipal water supply systems in Guelph, Fergus, and Elora is uncertain.

What We Found – Surface Water

- The surface water is sustainable now. This is based on the current water usage, measured water levels and flow, and climate conditions.
- **Surface water flow** is unsustainable in the future. An increase in surface water stress from a changing climate may impact fish locally in the Eramosa and Speed Rivers. An increase in municipal demand for surface water may also impact the Eramosa River. This is based on the Drinking Water Source Protection water budgets and climate change modeling.

Surface water flow is the amount of moving water that you can see in rivers, creeks, and streams.

Sustainable surface water flow is when there is enough water moving to meet the needs of the ecosystem and human uses.

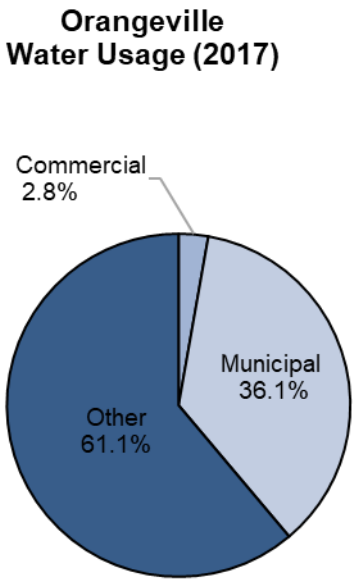
The Orangeville Study Area

About the Orangeville Study Area

- Includes the towns of Orangeville, Mono and Caledon, and the townships of East Garafaxa and Amaranth.
- Uses both groundwater and surface water for homes, towns, businesses, and industries.
- A lot of evidence-based information about the municipal water supply was available for review.
- A growing population and climate changes are the main stresses on water quantity.

Water Use

The amount of reported water taken in 2017 was about 10 million cubic metres. This is 0.01% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. Water taken for the Island Lake Reservoir Dam is in the "Other" category and was the single largest water use. Most of the water from the dam is returned to the Credit River and not used. When we remove the amount of water taken by Island Lake Reservoir from the total takings, municipal water supply represents almost all takings in 2017. This is about 4 million cubic metres.



What We Found - Groundwater

- Based on the Drinking Water Source Protection water budget, groundwater resources are sustainable under current conditions and the amount of water currently being pumped from all municipal wells is sustainable.
- Increases in population, changes in climate, and changing land use will put pressure on water quantity. As a result, the Drinking Water Source Protection water budget predicts that the sustainability of future municipal water supply system is uncertain.

What We Found – Surface Water

- The sustainability of surface water in the area now is uncertain. This is based on the frequency of low water notifications and alerts.
- Increased municipal groundwater takings and climate change may affect the water levels in local streams. This is based on our review of the Drinking Water Source Protection water budget.
- To be safe, our opinion is that surface water in this area will be unsustainable in the future based on the Drinking Water Source Protection water budget.

The Norfolk Sand Plain Study Area

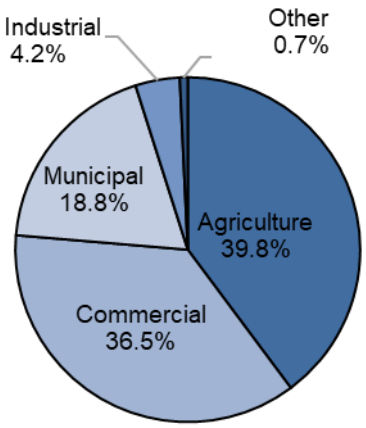
About the Norfolk Sand Plain Study Area

- The area overlaps multiple counties and includes some communities along the northern shore of Lake Erie, such as the Town of Simcoe.
- Uses both groundwater and surface water for their homes, businesses, industries, and farming.
- This area is known for growing crops that need watering. Most of the water used is used to irrigate crops and wash fruits and vegetables to sell at markets.
- A lot of evidence-based information for municipal water supplies in this area was available for review. Outside of these locations, there is less information on water quantity.
- The main stress on water quantity is the result of not enough rain during some summers, creating drought conditions.

Water Use

The amount of reported water taken in 2017 was about 43 million cubic metres. This is 15% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. Based on the number of permits and volume of water taken, agriculture is the largest group of users. Most of the water is taken in the summer to irrigate crops when there is not enough rain. Water taken for commercial use, such as aquaculture and golf course irrigation, is the second largest.

Norfolk Sand Plain Water Usage (2017)



What We Found - Groundwater

- Groundwater quantity in the area is sustainable now, except for the water supply systems for the Towns of Simcoe and Springford. It is informed by reviewing measured groundwater levels in the area and the Drinking Water Source Protection water budget. In 2016, Mt. Elgin had water shortages because of another water user's taking. This issue was resolved.
- The population is not expected to grow in the future. Groundwater is expected to remain sustainable in the future based on Drinking Water Source Protection water budgets.

What We Found – Surface Water

- Surface water is sustainable now based on current water use, measured water levels, flow, and climate conditions.
- There is a general concern for the worsening coldwater fish habitat overall.
- There is uncertainty around future sustainablity, unless demand can be managed in dry years, because surface water in this area is sensitive to drought, crop type (high vs. low water use) and possible **cumulative effects** if the municipalities also need to use the local water resources during this time.

Cumulative effects happen when you have multiple things impacting water quantity at the same time. In this case, it includes climate change, population changes, water being taken, and changes in how land is used.

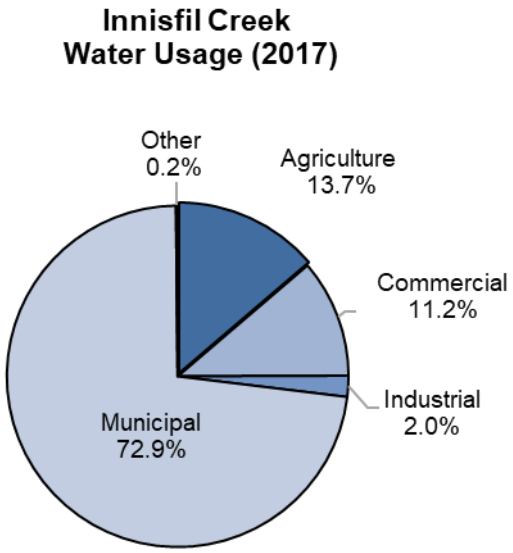
The Innisfil Creek Study Area

About the Innisfil Creek Study Area

- This area overlaps multiple counties and encompasses some population centres along the southwest shore of Lake Simcoe.
- This area uses both groundwater and surface water for homes, businesses, and farms.
- A lot of evidence-based information was available for review.
- More people and businesses wanting to take water and long periods of time without enough rain (expected to get worse with climate change) are the main stresses on water quantity.
- The Nottawasaga Valley Conservation Authority, with provincial funding, invested in a pilot project to create a proactive Drought Management Plan for the area of Innisfil Creek.

Water Use

The amount of reported water taken in 2017 was about 4.5 million cubic metres. This is about 5% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. About 73% of the reported volume taken in 2017 was for municipal use. The second largest use was to irrigate crops when there was not enough rain. Almost all the water used for irrigation was surface water.



What We Found - Groundwater

- Based on the measurement of groundwater levels, groundwater in this area is sustainable now.
- Groundwater in the area is sustainable in the future. This is based on measured water levels, and computer models predicting future climate conditions.
- The groundwater in this area is located deep underground. It is not expected to be affected by the future water needs of the local population or climate change.

What We Found – Surface Water

- Surface water in this area is not sustainable due to the ongoing demand for water for irrigation together with the low rainfall during the summer months. The creeks in the area depend on rainfall to recharge. Low rainfall during the summer months can result in low water levels in the creek. This means there is sometimes not enough water flowing, or moving in the creeks for a healthy fish population. It means that farmers cannot all irrigate at the same time when there is low rainfall because there is a limited amount of water in the creeks.
- Surface water is not sustainable in the future, unless irrigation demand can be managed. This conclusion is based on measured water levels and flow, and computer models predicting future climate conditions.

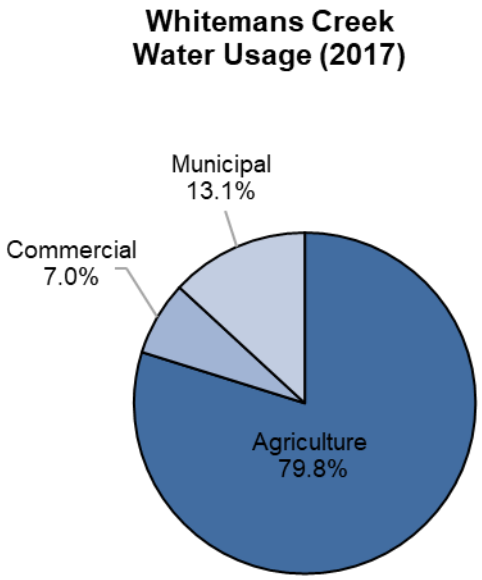
The Whitemans Creek Study Area

About the Whitemans Creek Study Area

- Includes the townships of Perth East, Wilmot, Blandford-Blenheim, Norwich, Zorra–Tavistock, County of Brant and some communities, such as the City of Woodstock.
- Groundwater and surface water are mostly used for farming.
- Municipal water wells supply the communities of Bright and Paris.
- A lot of evidence-based information for municipal water supplies in this area was available for review. Outside of these locations, there is less information on water quantity.
- Heavy demand for surface water for irrigation, particularly in the summer, contributes to the surface water quantity stress in the area.

Water Usage

The amount of reported water taken in 2017 was about 1.7 million cubic metres. This is about 6% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. Water taking for agriculture represents almost 80% of the reported water use. Most of the water taken is in the summer to irrigate crops when there is not enough rain.



What We Found - Groundwater

- Groundwater quantity is sustainable now and in the future. Our conclusion is informed by the groundwater levels measured across the area and the expected low population growth rate. This means a much greater demand on groundwater is not expected.
- Based on the Drinking Water Source Protection water budget, groundwater for the Bethel Road wells will not be sustainable in the future under drought conditions. These wells supply the Town of Paris. This is based on the expected population growth and related increase in demand for groundwater.

What We Found – Surface Water

- Surface water is not sustainable during the summer months now and in the future. Stream studies and high surface water use for irrigation in the summer informed the present findings. Computer predictions of how changes in climate will affect surface water quantity informed our findings for the future. Sustainability will continue to be a problem in the future unless demand is managed.

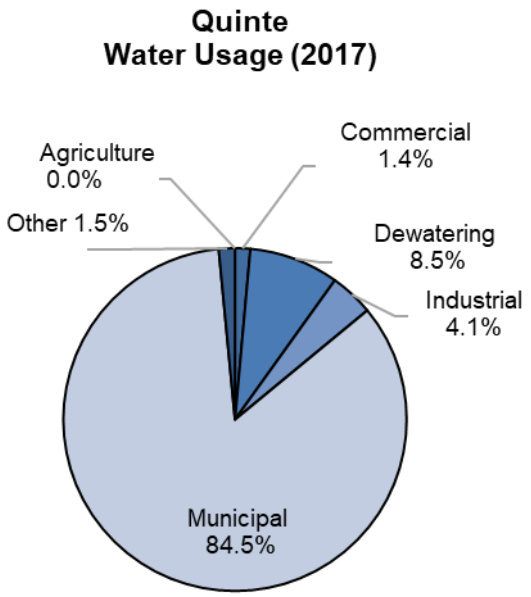
The Quinte Study Area

About the Quinte Study Area

- This area overlaps multiple counties and encompasses some population centres along the northern shore of Lake Ontario. There is one First Nation community in the area: the Mohawks of the Bay of Quinte.
- This area has very different geology and ways that land is used compared to the other areas.
- A lot of evidence-based information about the municipal water supply and surface water was available for review.
- The main stresses on water quantity are more people and businesses wanting to take water and long periods of time without enough rain (expected to get worse with climate change).

Water Use

The amount of reported water taken in 2017 was about 39 million cubic metres. This is about 16% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. Water taken for municipal purposes represents almost 84% of the reported water use. Dewatering is the second largest use representing about 8% of the total.



What We Found - Groundwater

- Groundwater resources are sustainable. In some parts of this area groundwater resources are not sustainable. This is because the local geology is not good at storing water. When there are summer conditions or drought, then streams, lakes, and shallow private wells may run low quickly. This is based on measured groundwater levels and existing climate conditions.
- Groundwater will not be sustainable in the future as a result of climate change. This is based on existing science, measured water levels and flow, and computer models predicting future climate conditions.

What We Found – Surface Water

- Surface water is currently sustainable under normal climate conditions. There are some local exceptions such as the Salmon River. It is not sustainable in the summer and in times of drought. This is based on current water use, measured water levels, flow and climate conditions.
- Surface water will not be sustainable in the future as a result of climate change. This is based on computer predictions of how changes in climate will affect surface water quantity in the area.

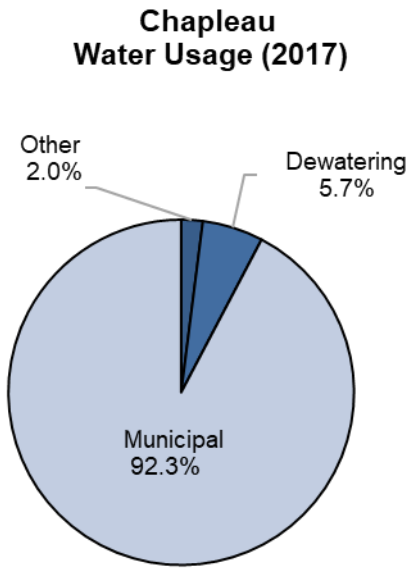
The Chapleau Study Area

About the Chapleau Study Area

- Located in Northern Ontario (about 250 km northwest of Sudbury and northeast of Lake Superior) and is mostly unaffected by human activities. First Nations communities live here: the Chapleau Cree, Brunswick House, and Chapleau Ojibway communities.
- This area uses surface water for municipal uses, homes, and industry. Groundwater is used for mining and private wells.
- This is the only area studied that does not fall within a Conservation Authority and is outside of a "Source Protection Area" (regulated under the Clean Water Act – 2000).
- There was less data for this area, which means we needed to make more assumptions.
- There is no expected water quantity stress in this area. There are no concerns based on the information reviewed.

Water Use

The amount of reported water taken in 2017 was less than half a million cubic metres (0.48). This is about 30% of the annual permitted amount. The pie chart to the right shows the amount of reported water taken by the type of use. Water taken for municipal purposes from the Kebsquasheshing River represents about 92% of the reported water use in 2017.



What We Found – Groundwater and Surface Water

- Based on the information available, water quantity is sustainable now and in the future. This is based on measured groundwater levels and low groundwater and surface water use in the area.
- Population growth is not expected to be a stress on groundwater or surface water in the future.
- Not a lot is known about the potential effects of climate change on surface water quantity in northern Ontario.

What We Learned – Effects of Water Bottling

Overall Findings

Based on our review, groundwater used for water bottling is sustainable at the current permit taking limits.

The current permit conditions ensure that water used for water bottling does not affect surface water, aquatic ecosystems, or other users in the study locations.

We reviewed how water quantity is managed when water is used for water bottling in ten locations. We reviewed existing information to evaluate the effects on local water quantity when water is used for water bottling. The information reviewed was based on the best practices of water quantity science. For each of the ten water bottling locations, we reviewed:

- The permit to take water history;
- The science used by qualified professionals to assess the potential impacts from the water taking, including: well pumping tests, water level monitoring for groundwater and surface water, completion of site water budgets and groundwater models;
- Information about the water bottling locations and their operations;
- Available studies on local groundwater and surface water resources;
- How much water is allowed to be taken compared to what is reported as taken; and
- How the water taking for bottling may affect water sustainability and the environment in that location.

Sustainability of Water Bottling

Based on all the information reviewed, we found that the amount of water taken for water bottling does not affect the sustainability of water resources. No concerns were found for the water quantity in the surrounding areas. We found that:

- No evidence suggested that the water supply of cities and towns was affected.
- No evidence suggested that other nearby water takers were affected.
- Seasonal shortages to water quantity due to climate conditions were not identified for most water bottling locations. When necessary, controls on water takings during seasonal shortage are specified through the permit and the Ontario Low Water Response program.
- No evidence suggested that surface water and aquatic environments are affected negatively.
- The amount of water taken is much less than the permit limits.
- Management practices for water bottling operations are the same in different parts of the province. Tracking and reporting are similar and adjusted to the size and potential impact of the water taking.
- For surface water, we noticed that there is some risk of stress during the summer in the Gott Enterprises (Amaranth) location. This risk is unrelated to water bottling. Based on the review, continued water takings at the permitted levels are not expected to impact surface water and natural functions of the ecosystem.

We found that the existing permit conditions are protecting the natural environment and other nearby water takings from unacceptable effects. The government should reconsider the need to manage water bottlers differently than other water takers. For water quantity management there is no science-based reason that water bottling needs more attention than other water uses. The level of effort needed when applying for a permit should match the potential effects of the amount of water taken. It should not be connected to the end use of the water.

About the Water Bottling Locations

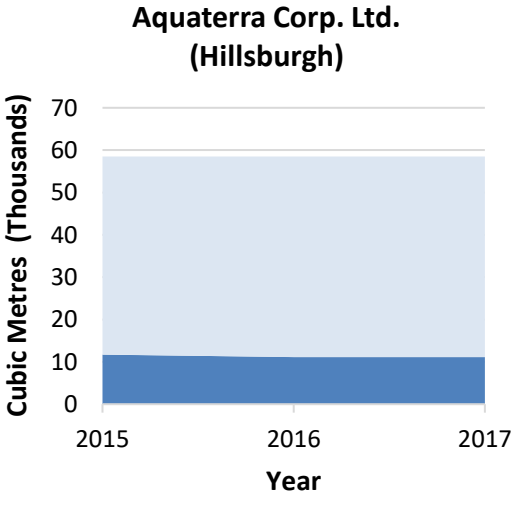
About the ten Water Bottling Locations

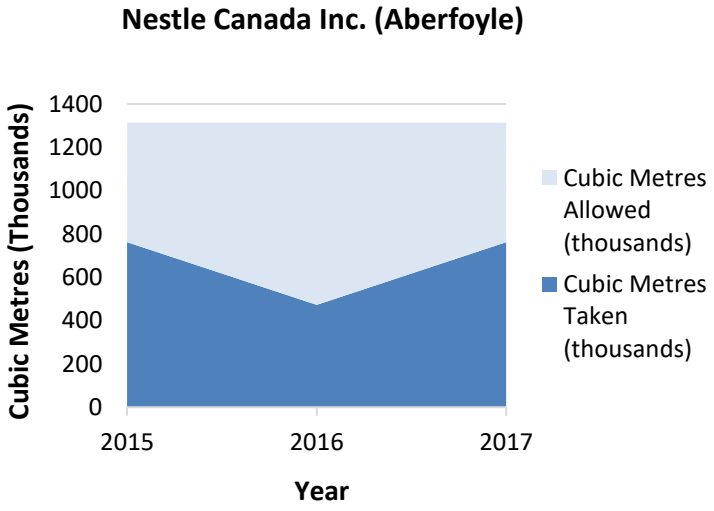
- All ten operations use groundwater for water bottling.
- Two companies take their water from overflowing wells that are still overflowing, even with the water taken by them (Savarin Springs Inc. and Aquaterra Corp. Ltd. in Hillsburgh).
- Between 2015 to 2017, eight out of ten water bottlers reported that they took less than 50% of their water taking limit, and five operations took less than 25% of their water taking limit.
- No water taking limits have been increased for water bottling since 2005.

Every water bottling company needs a permit if it is taking more than 50,000 litres (50 cubic metres) per day. The permit tells them how much water they are allowed to take per day. The table below shows how much water each company reviewed is allowed to take in a year for water bottling, and how much they actually took between 2015 and 2017.

Water Bottler	Annual Permitted Taking (million cubic metres)	Reported Annual Taking for 2015 to 2017 (percentage of Annual Permitted Taking)
Gott Enterprises Inc. (Alnwick/Haldimand)	0.27	40 to 45%
Gott Enterprises Inc. (Amaranth)	0.24	72 to 76%
Gott Enterprises Inc. (Grey Highlands)	1.20	40 to 43%
Aquaterra Corp. Ltd. (Cataract Site)	0.09	36 to 41%
Gold Mountain Springs Inc.	0.32	9 to 11%
Robins Holdings Inc.	0.08	0.04 to 5%
Savarin Springs Inc.	0.12	2 to 5%
Aquaterra Corp. Ltd. (Hillsburgh)	0.06	19 to 20%
Nestle Canada Inc. (Aberfoyle)	1.31	36 to 58%
Nestle Canada Inc. (Erin)	0.41	16 to 20%

The graphs below are examples of the information in the table. They illustrate what it looks like for the smallest permitted annual taking (left) and the largest permitted annual taking location (right). In this case, the units are in thousands not millions of cubic metres.





Our Advice on How to Manage Water in the Future

We found that the Government manages water resources using best scientific and best management practices. For example, Drinking Water Source Protection and the permit to take water programs both use a lot of data to inform decisions. These two programs are very important in how the Government of Ontario manages water resources. Our review showed that there is always room for improvement and a need for ongoing adaptation to change. The following informed our advice:

- The best practice review completed in Part 1 of the review; and
- Finding gaps in the information and identifying challenges during Part 2 of our review of water quantity study areas and water bottling locations.

Ways to Improve Collecting, Sharing and Assessing Data

- Collect, organize, and share water data in one place. This will make it easier to be used by scientists interested in studying sustainability of water quantity.
- Make water taking data available to the public in a timely manner.
- Assess water quantity across a larger, regional area in areas expected to be impacted by population growth, increased demand for water and climate change. This means that water levels, flow, and water taking information can be shared and reviewed together.
- Find new ways to evaluate the effects of drought on an area basis by increasing monitoring of groundwater levels, surface water levels and flow and water taking.
- Improve the tools and approaches for studying flow needs in local rivers and streams to make sure the fish population stays healthy. The approaches should include ways to understand how population growth and climate change may affect the environmental needs of rivers and streams.
- Develop a plan for assessing water quantity in northern Ontario.
- Include all known permit information in the system that tracks water takings. The reported data should be checked for completeness and accuracy.
- Make files related to permits electronic.

Ways to Improve Water Management

- Guide local water managers on how to:
    - Determine when and how to look at water quantity across a larger, regional area;
    - Assess how much water rivers and streams need for the environment to be healthy;
    - Assess how to measure the effects of climate change on water quantity; and
    - Assess if an area is sensitive to times with low rainfall.
- Include water resources in the land-use planning processes.
- Ensure ongoing monitoring and reporting to make sure that water resources continue to be sustainable up to the permit limits. This should consider land use changes, population growth and climate change.Require permit-holders to do studies if they want to increase their taking amount.
- Control what water is taken for irrigation in areas where drought and low water impacts are worsened by increased demand for surface water in the summer.
- Develop a plan to help municipalities manage water quantity across municipal boundaries.