Disclaimer

The information contained in this report has been compiled from various sources. The information gathered has been used to assess vulnerable areas across the region, and threats to municipal drinking water sources in accordance with prescribed methods of the *Clean Water Act (2006)* and the Technical Rules: Assessment Report (MOE 2008a). In the case of Midhurst Valley wells 1 and 2 in the Midhurst drinking water system (Township of Springwater), the Stayner well 4 and Klondike Road wells in the Stayner drinking water system (Township of Clearview), the Craighurst wells 4 and 5 in the Craighurst drinking water system (Township of Oro-Medonte), the updated wellhead protection area in the Colgan drinking water system (Township of Adjala-Tosorontio), the updated wellhead protection area in the Shelburne drinking water system (Town of Shelburne), and the updated wellhead protection area in the Palgrave drinking water system (Regional Municipality of Peel), the vulnerable areas and threats to municipal drinking water were assessed following the 2021 amendments to Technical Rules: Assessment Report (MECP 2021).

While every effort has been made to accurately depict the information, errors or omissions may exist. Given the size and complexity of this region, many of the assessments comprising this report were completed at a regional or watershed scale. As such, some site-specific details may not have been considered to date. Over time, this Assessment Report will be periodically updated and refined to reflect new and/or corrected information.

It should be noted that, where an activity has been classified as a significant threat in error, the forthcoming policy in the Source Protection Plan will **not** apply. Similarly, if a significant threat activity has been omitted in error, the forthcoming policy in the Source Protection Plan **will** apply.

Nottawasaga Valley Assessment Report

Table of Contents

- **Assessment Report Front Material**

1. **Chapter 1 Introduction**
   - **1.1** Drinking Water Source Protection and the Clean Water Act, 2006
   - **1.2** The Source Water Protection Process
   - **1.3** The South Georgian Bay-Lake Simcoe Source Protection Region
   - **1.4** Participants in the process
   - **1.5** Purpose and Scope of This Report
   - **1.6** How This Report is Organized
   - **1.7** Information Gaps and Continuous Improvement
2. **Chapter 2 Watershed Characterization**
   - **2.1** Introduction
   - **2.2** Watershed and Subwatershed boundaries
   - **2.3** Physical and Natural Geography
   - **2.4** Human Geography- Population and Land Use
   - **2.5** Drinking Water Systems
   - **2.6** Interaction between Physical and Human Geography
   - **2.7** Data and Knowledge Gaps
3. **Chapter 3 Water Budgets**
   - **3.1** Conceptual Water Budget
   - **3.2** Tier One Water Budget and Water Quantity Stress Assessment
   - **3.3** Tier Two Water Budget Summary and Methods
   - **3.4** Tier Two Water Budget and Water Quantity Stress Assessment- Innisfil Creek, Willow Creek, Pine River and Middle Nottawasaga River
   - **3.5** Tier Two Water Budget and Local Area Stress Assessment- City of Barrie
   - **3.6** Water Budgets That Cross Source Protection Regions
   - **3.7** Peer Review Process
4. **Chapter 4 Regional Groundwater Vulnerability**
   - **4.1** Groundwater Vulnerability
   - **4.2** Highly Vulnerable Aquifer Mapping (HVAs)
   - **4.3** Significant Groundwater Recharge Areas (SGRAs)
   - **4.4** Drinking Water Threats Evaluation
5. **Chapter 5 Methods Overview**
   - **5.1** Overview of Assessing Vulnerability, Issues and Threats
   - **5.2** Groundwater Vulnerability
   - **5.3** Surface Water Vulnerability
   - **5.4** Drinking Water Issues Evaluation
   - **5.5** Drinking Water Threats Evaluation

5.6 Acknowledgements

6. Chapter 6 Town of Shelburne

6.1 Introduction
6.2 Drinking Water Systems
6.3 Shelburne Well supply

7. Chapter 7 Regional Municipality of Peel

7.1 Introduction
7.2 Drinking Water Systems
7.3 Woodville Municipal Residential Water Supply
7.4 Palgrave Well Supply

8. Chapter 8 Township of Adjala-Tosorontio

8.1 Introduction
8.2 Drinking Water Systems
8.3 Colgan Well Supply
8.4 Hockley Well Supply
8.5 Everett Well Supply
8.6 Lisle Well Supply
8.7 Weca Well Supply
8.8 Rosemont Well Supply

9. Chapter 9 City of Barrie

9.1 Introduction
9.2 Drinking Water Systems
9.3 Barrie Well Supply

10. Chapter 10 Township of Clearview

10.1 Introduction
10.2 Drinking Water Systems
10.3 Buckingham Woods Well Supply
10.4 Colling-Woodlands Well Supply
10.5 Creemore Well Supply
10.6 New Lowell Well Supply
10.7 McKean Subdivision Well Supply
10.8 Stayner Well Supply

11. Chapter 11 Town of Collingwood

11.1 Introduction
11.2 Drinking Water Systems
11.3 Collingwood Water Treatment Plant

12. Chapter 12 Township of Essa

12.1 Introduction
12.2 Drinking Water Systems
12.3 Angus Well Supply

12.4 Glen Ave (Thornton) Well Supply

13. Chapter 13 Town of Innisfil

13.1 Introduction
13.2 Drinking Water Systems
13.3 Churchill Well Supply

14. Chapter 14 Town of New Tecumseth

14.1 Introduction
14.2 Drinking Water Systems
14.3 Alliston Water Works (Alliston and Hillcrest Water Supplies)
14.4 Tottenham Well Supply

15. Chapter 15 Township of Oro-Medonte

15.1 Introduction
15.2 Drinking Water Systems
15.3 Craighurst Well Supply

16. Chapter 16 Township of Springwater

16.1 Introduction
16.2 Drinking Water Systems
16.3 Anten Mills Well Supply
16.4 Del Trend Subdivision Well Supply
16.5 Midhurst Well Supply
16.6 Minesing Well Supply
16.7 Phelpston Well Supply
16.8 Snow Valley Highlands Well Supply
16.9 Vespra Downs Well Supply

17. Chapter 17 Town of Wasaga Beach

17.1 Introduction
17.2 Drinking Water Systems
17.3 Wasaga Beach Well Supply

18. Chapter 18 Township of Mulmur

18.1 Introduction
18.2 Drinking Water Systems
18.3 Mansfield Well Supply

19. Chapter 19 Town of Mono

19.1 Introduction
19.2 Drinking Water Systems
19.3 Cardinal Woods Subdivision Well Supply

20. Chapter 14 The Assessment Report in Context

20.1 Climate Change
20.2 How the Great Lakes were Considered

- Additional Items Raised by the Source Protection Committee

- **References**
- **Appendices**
    - Chapter 2 Appendix
    - Chapter 3 Appendix
    - Chapter 4 Appendix
    - Chapter 5 Appendix
    - Chapter 6 Appendix
    - Chapter 7 Appendix
    - Chapter 8 Appendix
    - Chapter 9 Appendix
    - Chapter 10 Appendix
    - Chapter 11 Appendix
    - Chapter 12 Appendix
    - Chapter 13 Appendix
    - Chapter 14 Appendix
    - Chapter 15 Appendix
    - Chapter 16 Appendix
    - Chapter 17 Appendix
    - Chapter 18 Appendix
    - Chapter 19 Appendix

Front Material

Table of Contents

Nottawasaga Valley Source Protection Area Assessment Report

(Note: The start of each chapter contains a full table of contents)

List of Appendices 53
Executive Summary 64
1 Introduction 64
2 About this Document 86
3 The South Georgian Bay - Lake Simcoe Region 97
4 The Committee 108
5 Key Terms 119
6 Drinking Water Threats 1412
7 Assessment Report Chapter Summaries 1614
Chapter 1: Introduction 1715
Chapter 2: Watershed Characterization 1715
Chapter 3: Water Budget 1917
Chapter 4: Assessing Regional Groundwater Vulnerability 2725
Chapter 5: Methods Overview 3129
Chapters 6-Onwards: Threats by Municipality 3129
6.1. Township of Adjala-Tosorontio 3129
6.2. City of Barrie 3735
6.3. Township of Clearview 4139
6.4. Town of Collingwood 4846
6.5. Township of Essa 5250
6.6. Town of Innisfil 5654

6.7. Town of Mono 6058
6.8. Township of Mulmur 6462
6.9. Town of New Tecumseth 6866
6.10. Township of Oro-Medonte 7270
6.11. Regional Municipality of Peel 7674
6.12. Town of Shelburne 8078
6.13. Township of Springwater 8482
6.14. Town of Wasaga Beach 9088
8 The Assessment Report in Context: Final Chapter 9492
9 Moving Towards Source Protection Plans 9997
List of Acronyms 10098

List of Figures

Figure 1: Map of the South Georgian Bay Lake Simcoe Source Protection Region 97
Figure 2: Tiered Water Budget and Risk Assessment Process 2018
Figure 3: Map of Highly Vulnerable Aquifers: Nottawasaga Valley Watershed 2927
Figure 4: Significant Groundwater Recharge Areas: Nottawasaga Valley Watershed 3028

List of Tables

Table 1. Number of Drinking Water Systems, Municipal Wells, and Surface Water Intakes by Source Protection Area 17
Table 2: Subwatersheds and Municipal Summary of the Water Budget and Risk Assessment Process: Nottawasaga Valley 23

Table 3: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Adjala-Tosorontio Drinking Water Supplies have been identified, Enumeration of Significant Threats (Wellhead Protection Area) 34

Table 4: Number of Parcels in Lake Simcoe and Nottawasaga Valley where potential Significant Drinking Water Threats for the City of Barrie Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Area) 39

Table 5: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Clearview Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 44

Table 6: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Town of Collingwood Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 50

Table 7: Number of Parcels in Nottawasaga Valley where a potential Significant Drinking Water Threats for the Township of Essa Drinking Water Supply has been identified, Enumeration of Significant Threats (Wellhead Protection Areas)..... 54

Table 8: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Town of Innisfil Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)..... 58

Table 9: Number of Parcels in Nottawasaga Valley a potential Significant Drinking Water Threat(s) for the Town of Mono Drinking Water Supply has been identified. Enumeration of Significant Threats (Wellhead Protection Areas)..... 62

Table 10: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threat(s) for the Township of Mulmur Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 66

Table 11: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of New Tecumseth Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 70

Table 12: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Oro-Medonte Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 74

Table 13: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Peel Region Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 78

Table 14: Number of Parcels in Nottawasaga Valley parcels where potential Significant Drinking Water Threat(s) for the Town of Shelburne Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 82

Table 15: Number of Parcels in Nottawasaga Valley where a potential Significant Drinking Water Threats for the Township of Springwater Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas) 87

Table 16: Number of Parcels where a potential Significant Drinking Water Threats for the Town of Wasaga Beach Drinking Water Supply has been identified, Enumeration of Significant Threats (Wellhead Protection Areas)..... 92

Table 17: Greenhouse Gas (GHG) Emission Scenarios: Summary of projected increase in Source Protection Region average annual temperature (°C) in the 2050s compared with 1961-1990 .. 94

Table 18: Greenhouse Gas (GHG) Emission Scenarios: Summary of projected increase in Source Protection Region precipitation (%) in the 2050s compared with 1961-1990..... 95

List of Appendices

Appendix WC- Watershed Characterization

Appendix WB- Water Budget

Appendix MO- Methods Overview

Appendix SB- Town of Shelburne

Appendix P-Peel Region

Appendix A- Township of Adjala-Tosorontio

Appendix B- City of Barrie

Appendix C- Township of Clearview

Appendix CW- Town of Collingwood

Appendix E- Township of Essa

Appendix I- Town of Innisfil

Appendix N- Township of New Tecumseth

Appendix OM- Township of Oro-Medonte

Appendix S- Springwater

Appendix W- Town of Wasaga Beach

Appendix MR- Township of Mulmur

Appendix MN- Town of Mono

Executive Summary

1 Introduction

> "The first barrier to the contamination of drinking water involves protecting the sources of drinking water. I recommend that the Province adopt a watershed-based planning process … to develop a source protection plan for each watershed in the province."
>
> Justice Dennis O'Connor
> The Walkerton Inquiry, 2002

The tainted water tragedy at Walkerton in 2000 highlighted the dangers of not protecting the sources of our drinking water. Hundreds became ill and seven died when a municipal well was polluted. In 2002 Justice Dennis O'Connor recommended a number of changes be made to Ontario's drinking water system, the most comprehensive of which was Source Water Protection. The province responded with the *Clean Water Act, 2006* (CWA) which was proclaimed into effect on July 3, 2007. The CWA introduced a new level of protection – **Source Water Protection** – for the Province's drinking water resources that will help communities across Ontario enjoy a safe and plentiful supply of clean drinking water.

The basic premise of Source Water Protection is simple:

Protecting our Sources of drinking water before they are overused or polluted is the best, most cost-effective way of ensuring the safety of our drinking water for generations to come.

Though it is an easy concept, putting Source Water Protection into practice is a challenge because it involves gathering a vast amount of data, analyzing the data and communicating its findings. Water belongs to everyone and it is everyone's responsibility to protect it. Source Water Protection is designed to be a locally-driven process and involves people from all across the province from all different sectors of society. This local involvement is a huge strength of the process. The province set out a 5-year plan to develop and enact source protection plans. This process started in 2008 and will continue well beyond the completion of source protection plans in 2012 to ensure safe, clean drinking water is available to residents of Ontario for years to come.

The source protection process timeline involves four stages over five years.

Year 1 (2008-2009): Stage 1

- Laying the foundation:
  - Establish source protection authorities
  - Establish source protection committees
  - Negotiate terms of reference

Year 1-2 (2009-2010): Stage 2

- Assessment of threats:
  - Identify and assess threats to drinking water
  - Prepare Assessment Report

Year 3-5 (2010-2012): Stage 3

- Source Protection Planning:
  - Prepare source protection plan, including policies to address significant threats to drinking water

Year 5+ (2012+): Stage 4

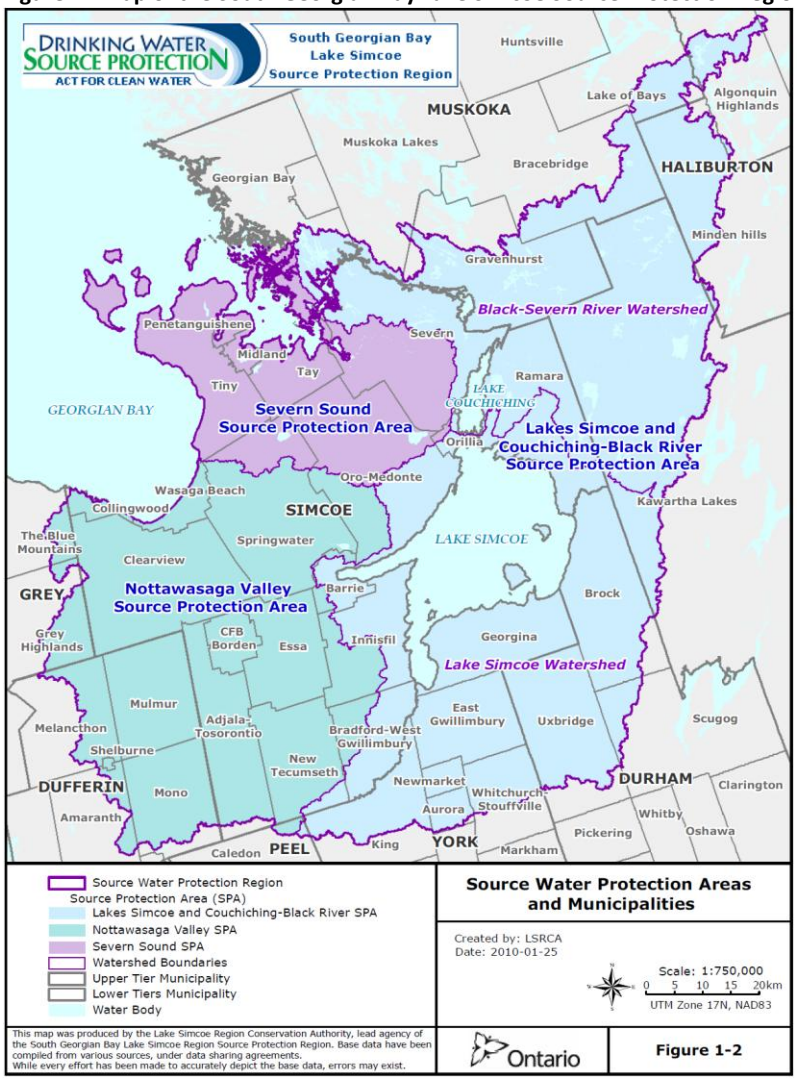
- Implementation:
  - Implement the source protection plan
  - Inspect and enforce
  - Monitor and report
  - Review plan

2 About this Document

This is a companion document to the Nottawasaga Valley Source Protection Area Assessment Report. This document is designed to give the reader a high-level overview of the technical findings as well as direct them to the appropriate chapter for more information. This is an excellent starting place for people not familiar with Assessment Reports and what kind of information can be found therein. For more comprehensive information, the reader is directed to the full text of each Assessment Report which can be found on our website at www.ourwatershed.ca.

3 The South Georgian Bay - Lake Simcoe Region

Figure 1: Map of the South Georgian Bay Lake Simcoe Source Protection Region



The South Georgian Bay-Lake Simcoe (SGBLS) Source Protection Region (SPR) is one of 19 Source Protection Regions across Ontario (See Figure 1). It contains four watersheds that encompass fifty-two municipalities and three First Nations communities, with 107 drinking water systems, 284 municipal wells, 16 municipal surface water intakes, and more than 50,000 private wells. It stretches from the GTA in the south and as far north as Algonquin Park. It is one of the most diverse regions in the province in every respect: geography, population, land use, and geology. All told, the region has about one third of the municipal systems in the province!

The region is divided into three (3) **Source Protection Areas (SPAs)**. These three SPAs follow the existing boundaries of the Lake Simcoe Region Conservation Authority (with the addition of the Black Severn River watershed), the Nottawasaga Valley Conservation Authority, and the Severn Sound Environmental Association. Each of these Source Production Areas belong to the South Georgian Bay-Lake Simcoe Source Protection Region. Each of the three Source Protection Areas are required to produce a separate Assessment Report. For ease, this document represents a composite of all three Assessment Reports presenting the key findings of each.

4 The Committee

Mission:

The Source Protection Committee exists to ensure an open process is followed in the development of reasonable, science-based policies that protect municipal sources of drinking water now and into the future.

The Source Protection Committee (SPC) is responsible for creating the Assessment Reports as well as the Source Protection Plan. The SPC is a reflection of the people who live in the watershed. Source Water Protection is designed to be a locally driven process, and so the committee is comprised of local residents who know and understand the concerns of residents in the Region. The committee represents a wide range of experience ranging from public interest and health, to municipal, agricultural, industrial and economic representatives all of which is integral to developing local, relevant, respected plans to protect drinking water. The committee members' full biographies are available on www.ourwatershed.ca.

The Source Protection Committee is responsible for developing three key pieces of documentation that will complete the Source Protection Planning process:

1. **Terms of Reference**: lays out who will be responsible for what part of the Source Protection Plan and how the work will be conducted (approved June 29, 2009)

2. **Assessment Report**: describes the watershed and as well as identifies the number of potential threats to local drinking water sources (this is the executive summary of this document)
3. **Source Protection Plan:** includes policies to address threats to drinking water, including both voluntary and mandatory measures to reduce activities identified as risks; this will include broad consultation with the public (due in 2012)

The Source Protection Committee is supported by Source Protection Authority staff and scientists as well as working groups who will help them in developing these documents.

The Lake Simcoe Region Conservation Authority (with representation from the Black River watershed), Nottawasaga Valley Conservation Authority and Severn Sound Environmental Association, all acting as Source Protection Authorities, are responsible for reviewing these documents and recommending them to the Ministry of Environment, Conservation and Parks for approval.

Once the Ministry of Environment, Conservation and Parks has granted approval, it will be up to municipalities to implement them.

5 Key Terms

Aquifer

Aquifers are underground water-bearing layer(s) of soil, sand, gravel, or rock that will yield usable quantities of water to a well. Aquifers can be layered, and, generally speaking, the deeper the aquifer the more protected it is. Most municipal wells draw from very deep aquifers.

Hazard Rating

This is the score that is associated with the threat activities. It is determined by threats tables provided to the committee by the Ministry of the Environment.

Highly Vulnerable Aquifers (HVA)

These are aquifers that are more susceptible to contamination because of their location. In general, an HVA will consist of source granular aquifer materials (e.g. sand and/or gravel) or fractured rock that has a high permeability and is exposed near the ground surface with a relatively shallow water table.

Intake Protection Zone (IPZ)

The area on the water and land surrounding a municipal surface water intake. It consists of three 'zones': IPZ-1 is a 1km radius around the intake; IPZ-2 is based on the amount of time it takes a potential contaminant to reach the intake based on the time it takes the operator to shut down the plant (minimum two hours); and IPZ-3 is the area of the water and land that may lead to contaminants reaching an intake during an extreme event (such as a one in one hundred year rainfall).

South Georgian Bay- Lake Simcoe (SGBLS)

The region which comprises the three Source Protection Areas: Lakes Simcoe and Couchiching-Black Severn River Source Protection Area, Nottawasaga Valley Source Protection Area, and Severn Sound Source Protection Area.

Significant Groundwater Recharge Areas (SGRA)

Recharge areas tend to be areas that are characterized by permeable soils, such as sand or gravel that allow the water to seep easily into the ground and flow to an aquifer. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community with drinking water, or supplies groundwater recharge to a cold-water ecosystem that is dependent on this recharge to maintain its ecological function.

Significant (moderate, low) Drinking Water Threat

A drinking water threat is scored as significant if its threat score is over 80. This is determined by multiplying the hazard ranking by the vulnerability score. Scores between 60 and 79 are determined to be moderate drinking water threats while scores between 40 and 59 are considered a low drinking water threat. The source protection plan must make policies to reduce all significant drinking water threats.

Source Protection Plan

The Source Protection Plan is the culmination of all the work to date. It outlines policies that will outline how drinking water threats are to be mitigated. This can include existing legislation, risk management plans, education and outreach policies, and, in certain cases the committee can prohibit existing or future activities in a particular location.

Threat Score

The threat score is the product of the hazard score (how bad is the threat) and the vulnerability score (how vulnerable is the land).

Vulnerability Score

The vulnerability score of a parcel of land is determined by looking at how close it is to a well, how easily water can travel through it, as well as if there are any transport pathways (i.e. an improperly decommissioned well is a conduit to the aquifer and would be considered a "transport pathway").

Vulnerable Area

The *Clean Water Act* states that there are four vulnerable areas which we must map as part of the Source Water Protection process. These are: Wellhead Protection Areas (WHPAs), Intake Protection Zones (IPZ), Highly Vulnerable Aquifers (HVA) and Significant Groundwater Recharge Areas (SGRAs).

Water Budget

A Water Budget is a tool that helps us ensure we have enough water. It measures how much water enters the system, how much leaves the system (through natural processes and human consumption) in order to determine if water being used is more than is available (water quantity stresses) within a watershed.

Wellhead Protection Area (WHPA)

A Wellhead Protection Area is the area on the land around a municipal well, the size of which is determined by how quickly water travels underground to the well, measured in years.

6 Drinking Water Threats

Under the *Clean Water Act*, there are 21 categories of potential threats representing numerous activities which can negatively affect the quality and/or quantity of drinking water. The following activities are **prescribed as Drinking Water Threats**:

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid.
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.
22. The establishment and operation of a liquid hydrocarbon pipeline.

Whether these activities are considered a Significant, Medium or Low Drinking Water Threat (or even a threat at all) depends on a scoring process that considers both the vulnerability of the well or surface intake to contamination (Vulnerability Score) and how hazardous the activity is (Hazard Rating). If, when you multiply the two scores together you get a number (Risk Score) higher than 80, then the activity is a Significant Drinking Water Threat. If the number scores between 60 and 79, it is considered a Moderate Drinking Water Threat, and between 40 and 59 it is considered a Low Drinking Water Threat.

Hazard Rating x Vulnerability Score = Risk Score

The Ministry of the Environment, Conservation and Parks has provided tables which outline the **Hazard Rating** of the "prescribed threats" (listed above), this rating depends on what is called the "circumstance" i.e. how much, and how dangerous each of those 22 threats are. For example, storage of 10 tonnes of chemical A will have a higher Hazard Rating than one ton of the same chemical. Likewise, a 100-gallon underground fuel tank will have a lower Hazard Rating than a 1000 gallon one (e.g. a domestic fuel tank compared to a gas station).

The **Vulnerability Score** is determined by looking at the landscape around a water source and determining how the geology, geography, hydrogeology and soil (among other things) work together to affect how slowly or quickly the water is moving toward the source of drinking water. This is called intrinsic vulnerability. If the water moves quickly, it follows that a contaminant would also move quickly; therefore, that area will be more vulnerable. If it is more difficult for the contaminant to get to the source, the landscape is less vulnerable. Other factors are taken into consideration to determine the Vulnerability Score, such as old wells which may be a conduit for contamination to get quickly into the water underground (these are called transport pathways).

7 Assessment Report Chapter Summaries

The Assessment Report both gives an overview of the watershed, its characteristics and the availability of water as well as gives specific information on where threats exist on the landscape and of what nature the threats are.

What follows is the summary, by chapter of the Assessment Report. For ease of reading, the highlights of the Nottawasaga Valley Source Protection Area, are compiled in this document.

The required components of an Assessment Report are as follows:

- **Characterization of the Source Water Protection Area watershed**: this includes descriptions of the natural and human geography
- **A Conceptual water budget for the entire Source Water Protection Area and a Tier 1 water budget for each subwatershed**: those systems identified as having a potential water quantity stress in the Tier 1 water budget, progress to a more detailed Tier 2 water budget, and Tier 3 risk assessment if needed
- **Broad scale assessment of Regional Groundwater Vulnerability**: this aspect of the Assessment Report requires both Highly Vulnerable Aquifers (HVA) and Significant Groundwater Recharge Areas (SGRAs) be identified
- **Drinking water system assessment**: for each municipal drinking water system within the Terms of Reference, the Vulnerability of the supply wells or surface water intakes is assessed and any potential Significant Threats to the water quality are identified

The content of the Assessment Report is based on the best available information and have been prepared to meet all the requirements of the *Clean Water Act* and Technical Rules. There are cases; however, where required information is either not available (a data gap) or the information provided is not based on the most recent data. The Assessment Report will be periodically updated so that any new data or information can be included.

Chapter 1: Introduction

This chapter introduces the reader to the South Georgian Bay- Lake Simcoe Source Protection region, its structure, committee and the municipal water systems therein.

As highlighted in the Table 1 below, within the Nottawasaga Valley Source Protection Area there are 110 municipal supply wells and 1 surface water intake providing water for 34 drinking water systems.

Table 1. Number of Drinking Water Systems, Municipal Wells, and Surface Water Intakes by Source Protection Area

Source Protection Area	Number of drinking water Systems	Number of Municipal Supply Wells	Number of Municipal Surface Water Intakes
Lake Simcoe and Lake Couchiching – Black River - Lake Simcoe	30	79	7
Lake Simcoe and Lake Couchiching – Black River - Black-Severn	10	10	6
Nottawasaga Valley	34	110	1
Severn Sound	35	88	2
Total	109* (107)	287**	16

Notes to the table above:

1. *Systems in Barrie and Orillia counted twice in the Total as the drinking water systems are in two Source Protection Areas
2. ** Number of wells in each SPA location, some wells are servicing communities in other SPAs

Chapter 2: Watershed Characterization

Watershed characterization is a snapshot of the entire watershed, including the physical and natural geography and the boundaries encompassing both human and natural features. Understanding the characteristics of a watershed is essential in understanding how quality and quantity of drinking water is affected by both human and natural interactions.

Nottawasaga Valley

The Nottawasaga Valley Source Protection Area is located in the south-west quarter of the South Georgian Bay-Lake Simcoe Source Water Protection Region and is bounded to the south by the Humber and Credit River watersheds and the east by the numerous small streams which drain into Lake Simcoe. The Niagara Escarpment forms part of the western boundary, separating the Nottawasaga Valley from the Grand, Grey Sauble and Saugeen watersheds.

The watershed varies from the more densely populated urban centers such as Collingwood and Wasaga Beach along the shoreline of Georgian Bay, to the prominent agricultural communities in most other areas. Despite over 181,000 people living in the watershed, agricultural activities are the largest single land use in the watershed, including large areas of hay/pastures and row crops.

The Nottawasaga Valley Watershed lies within the Counties of Simcoe (74%), Dufferin (22%), and Grey (4%). The watershed is bounded to the south by the Humber and Credit River Watersheds. The Niagara Escarpment forms part of the western boundary, separating the Nottawasaga Valley from the Grand and Saugeen Watersheds. On the east, the Nottawasaga Valley Watershed is bounded by the numerous streams which drain into Lake Simcoe.

The Nottawasaga Valley has 9 subwatersheds, the largest subwatershed being the Lower Nottawasaga River at 455 km^2, and the smallest being the Blue Mountains subwatershed at 220 km^2. The Nottawasaga River is approximately 122 km in length along its main channel and has a drainage area of 3,147 km^2. The main branch of the river's source is in the till moraines of Amaranth Township at an elevation of almost 490 meters. The Blue Mountains subwatershed, does not flow into the Nottawasaga River, but consists of a number of smaller rivers that drain directly into Georgian Bay. An unusual characteristic of the Nottawasaga Valley watershed is its virtual lack of natural lakes. Overall, 1,086 km^2 of the Nottawasaga Valley watershed is considered natural vegetative cover, or approximately 34.5% of the total area. Wetlands occupy approximately 12% of the Nottawasaga Valley watershed with large expanses of wetlands being found on poorly drained lands on the Dundalk Plain above the Niagara Escarpment and the Lake Simcoe Lowlands in the central portion of the watershed.

The Nottawasaga Valley Watershed is located within four (4) regional-scale physiographic regions as defined by Chapman and Putnam (1984). These regions include the Horseshoe Moraines, Peterborough Drumlin Field, Simcoe Lowlands and the Simcoe Uplands.

Chapter 3: Water Budget

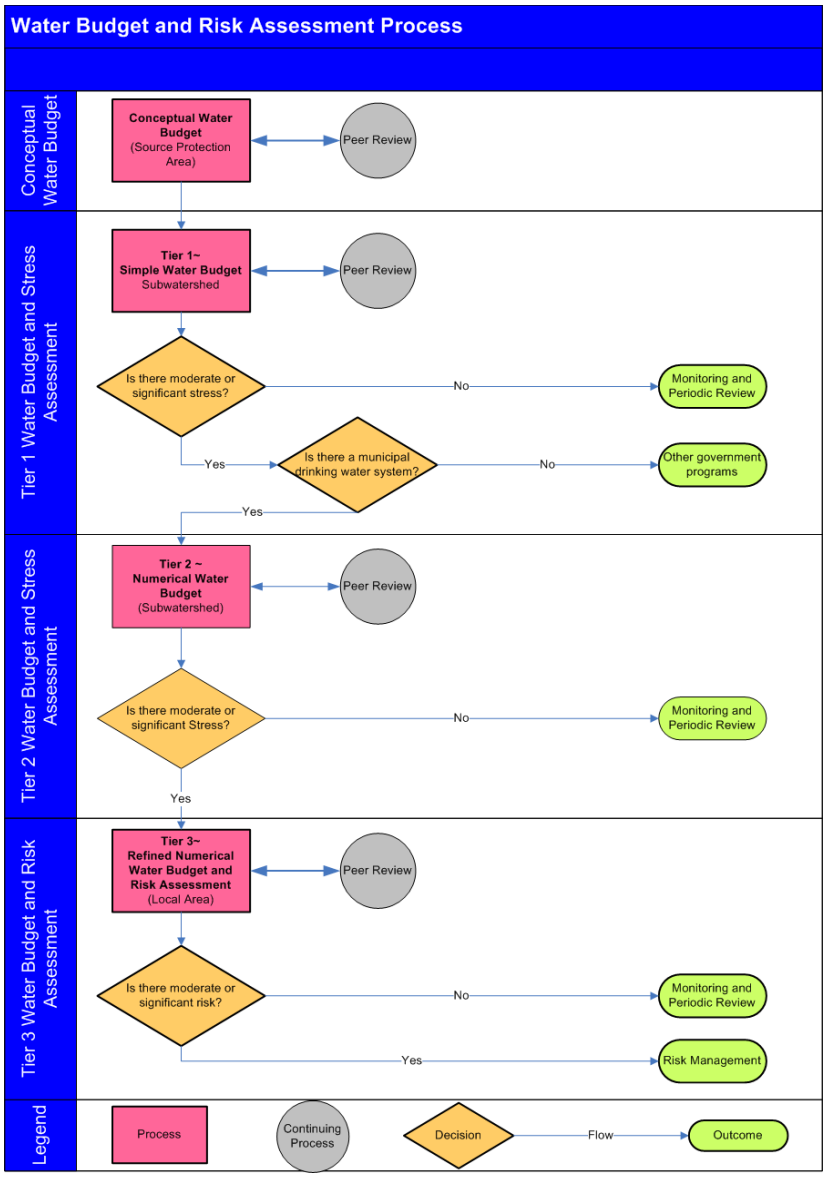
A consistent supply of drinking water is vital for the people living within the Lake Simcoe watershed to live and conduct business. Within the watershed, drinking water is obtained from municipal and private wells, and surface water taken directly from Lake Simcoe or Lake Ontario. Groundwater wells and surface water intakes supply the agricultural industry with the large volume of water needed for livestock watering and crop irrigation. The recreation, commercial and industrial industries also require ground and surface water to continue to be viable. In addition, water is required for natural processes for habitat, and food for wildlife in the area. Therefore, it is important to understand where our drinking water is coming from, and how abundant or limited the supply may be in some regions of the watershed.

A water budget analysis is used to manage the quantity of existing and future sources of drinking water. The water budget aims to determine the location and quantity of water within the various components of the hydrologic system, and uses data to characterize how the water moves through the watershed. A water budget is used to determine how much water enters the watershed, how much is stored within the watershed and how much water leaves it (through natural or human processes). The analysis helps determine the amount of water available for human use while ensuring enough is left for natural processes to maintain ecological needs. It also aids in the management of future water needs within the watershed.

The water budget component for the Assessment Report has been conducted on a tiered approach, which can consist of up to four levels of analysis depending on the potential stress level of each tier (See Figure 2) . As you proceed from one tier to the next, the scope of study narrows, and the science becomes more complex:

- **Conceptual Water Budget**
- **Tier 1**
- **Tier 2**
- **Tier 3**

Figure 2: Tiered Water Budget and Risk Assessment Process



All subwatersheds are required to undergo a Conceptual water budget and Tier 1 water budget analysis in the Assessment Report. If any subwatersheds are found not to be stressed from a water quantity perspective or do not contain a municipal drinking water system, they are excluded from further study in the source protection planning process.

If a subwatershed is identified as exceeding the proscribed threshold for potential stress and contains municipal drinking water systems, it advances to a more complex Tier Two water budget analysis. The goal of the Tier Two assessment is to confirm or negate the stress assignment completed in the Tier One using a more detailed approach that includes complex numerical modeling. The Tier Three Water Budget and Water Quantity Risk Assessments are carried out for municipal groundwater systems that are located within subwatersheds that have been assigned a Tier Two moderate or significant potential level of stress.

Water quantity risk refers to the likelihood that threats to water quantity may render an existing or planned drinking water source impaired, unusable or unsustainable. The objective of the Tier Three assessment is to evaluate the risk that a community may not be able to meet its current or future water demand from a water source (e.g., stream, lake, or aquifer). Several subwatersheds in the Region were identified for further evaluation and underwent Tier Three Water Budget and Water Quantity Risk Assessments.

The above flow chart depicts how a decision is made to move to the next Tier in the water budget and risk assessment process. It is important to note that an essential component in the water budget process is that each study is required to be peer reviewed by a team of qualified professionals. Each of the water budget studies discussed within the chapter were subsequently peer reviewed by qualified professionals. The objectives of the peer review team include:

1. To ensure consistency with the expectations of the Technical Rules for completion of the Assessment Report
2. To ensure appropriate methodologies are utilized, and that the technical assumptions are necessary and reasonable
3. To ensure scientifically defensible products

The Conceptual and Tier 1 Water Budgets were completed for the Nottawasaga Valley Source Protection Area. Additional water budget efforts (Tier 2 assessments) were necessary for four subwatersheds that were identified within the Tier 1 water budget as the subwatersheds were above the stress thresholds identified in the Technical Rules. An even further water budget analyses (Tier 3) was undertaken for municipal systems that were identified in the Tier 2 study as being stressed. This includes the water supply system for the City of Barrie.

The following Table 2 of the Nottawasaga Valley Source Protection Area, indicates which subwatersheds showed potential stress at a Tier One Level, and were progressed for further analysis.

Table 2: Subwatersheds and Municipal Summary of the Water Budget and Risk Assessment Process: Nottawasaga Valley

Subwatershed	Upper Tier Municipality	Lower Tier Municipality	Municipal Drinking Water System (Yes/No)	Conceptual /Tier 1	Tier 2	Tier 3
Blue Mountains	Simcoe County	Township of Clearview	Yes (GW)	Yes		
Blue Mountains	Simcoe County	Town of Collingwood	Yes (GW)	Yes		
Blue Mountains	Simcoe County	Town of Wasaga Beach	Yes (GW)*	Yes		
Blue Mountains	Grey County	Town of Blue Mountains	No	Yes		
Blue Mountains	Grey County	Municipality of Grey Highlands	No	Yes		
Boyne River	Simcoe County	Township of Adjala-Tosorontio	Yes (GW)	Yes		
Boyne River	Simcoe County	Town of New Tecumseth	Yes (GW)	Yes		
Boyne River	Simcoe County	Township of Essa	Yes (GW)*	Yes		
Boyne River	Dufferin County	Town of Shelburne	Yes (GW)	Yes		
Boyne River	Dufferin County	Town of Mono	Yes (GW)*	Yes		
Boyne River	Dufferin County	Township of Mulmur	Yes (GW)*	Yes		
Boyne River	Dufferin County	Township of Amaranth	No	Yes		
Innisfil Creeks	Simcoe County	Town of New Tecumseth	Yes (GW)	Yes	Yes	
Innisfil Creeks	Simcoe County	Town of Innisfil	Yes (GW)	Yes	Yes	
Innisfil Creeks	Simcoe County	Town of Adjala-Tosorontio	Yes (GW)	Yes	Yes	

Subwatershed	Upper Tier Municipality	Lower Tier Municipality	Municipal Drinking Water System (Yes/No)	Conceptual /Tier 1	Tier 2	Tier 3
Innisfil Creeks	Simcoe County	Town of Bradford West Gwillimbury	Yes (GW)*	Yes		
Innisfil Creeks	Simcoe County	Township of Essa	Yes (GW)*	Yes		
Innisfil Creeks	Peel Region	Town of Caledon	Yes (GW)	Yes	Yes	
Innisfil Creeks	York Region	Township of King	Yes (GW)*	Yes		
Lower Nottawasaga River	Simcoe County	Township of Springwater	Yes (GW)	Yes		
Lower Nottawasaga River	Simcoe County	Township of Clearview	Yes (GW)	Yes		
Lower Nottawasaga River	Simcoe County	Town of Wasaga Beach	Yes (GW)	Yes		
Lower Nottawasaga River	Simcoe County	Township of Tiny	Yes (GW)*	Yes		
Mad River	Simcoe County	Township of Clearview	Yes (GW)	Yes		
Mad River	Simcoe County	Township of Essa	Yes (GW)*	Yes		
Mad River	Simcoe County	Township of Adjala-Tosorontio	Yes (GW)*			
Mad River	Simcoe County	Municipality of Grey	No			
Mad River	Simcoe County	Township of Mulmur	Yes (GW)*			
Mad River	Simcoe County	Township of Melancton	No			

Subwatershed	Upper Tier Municipality	Lower Tier Municipality	Municipal Drinking Water System (Yes/No)	Conceptual /Tier 1	Tier 2	Tier 3
Middle Nottawasaga River	Simcoe County	Township of Essa	Yes (GW)	Yes	Yes	
Middle Nottawasaga River	Simcoe County	Town of New Tecumseth	Yes (GW)	Yes	Yes	
Middle Nottawasaga River	Simcoe County	Township of Essa	Yes (GW)*	Yes		
Middle Nottawasaga River	Simcoe County	Town of Innisfil	Yes (GW & SW)*			
Middle Nottawasaga River	Simcoe County	Township of Springwater	Yes (GW)*			
Middle Nottawasaga River	City of Barrie	City of Barrie	Yes (GW & SW)*	Yes	Yes	
Pine River	Dufferin County	Township of Mulmur	Yes (GW)	Yes	Yes	
Pine River	Simcoe County	Township of Adjala-Tosorontio	Yes (GW)	Yes	Yes	
Pine River	Simcoe County	Township of Essa	Yes (GW)	Yes	Yes	
Pine River	Simcoe County	Township of Melancthon	Yes (GW)*	Yes		
Pine River	Simcoe County	Township of Clearview	Yes (GW)*	Yes		
Upper Nottawasaga River	Simcoe County	Township of Adjala-Tosorontio	Yes (GW)	Yes		

Subwatershed	Upper Tier Municipality	Lower Tier Municipality	Municipal Drinking Water System (Yes/No)	Conceptual /Tier 1	Tier 2	Tier 3
Upper Nottawasaga River	Simcoe County	Town of New Tecumseth	Yes (GW)	Yes		
Upper Nottawasaga River	Dufferin County	Town of Mono	Yes (GW)	Yes		Yes**
Upper Nottawasaga River	Dufferin County	Township of Amaranth	No	Yes		
Upper Nottawasaga River	Dufferin County	Township of Mulmur	Yes (GW)*	Yes		
Willow Creek	Simcoe County	Township of Oro-Medonte	Yes (GW)	Yes	Yes	
Willow Creek	Simcoe County	Township of Springwater	Yes (GW)	Yes	Yes	
Willow Creek	City of Barrie	City of Barrie	Yes (GW)	Yes	Yes	Yes***

Notes to the table above:

1. All subwatersheds are required to undergo a Conceptual and Tier 1 analysis. Subwatersheds that are not moving beyond a Tier 1 analysis do not have a municipal groundwater system, and/or were found not to be stressed
2. * The municipal drinking water system is not located within this subwatershed
3. ** Cardinal Woods in Dufferin was included in the Orangeville Tier 3 Water Budget Study as it fell within the local area. The Orangeville Tier 3 can be found within the Credit Valley, Toronto & Region and Central Lake Ontario (CTC) Source Protection Region Assessment Report
4. *** Barrie will be proceeding to a Tier 3 Water Quantity Risk Assessment because the majority of the system's supply wells are located within the stressed subwatersheds of Barrie and Lovers Creek Subwatershed within the adjacent Source Protection Area (Lake Simcoe Watershed)

Chapter 4: Assessing Regional Groundwater Vulnerability

The *Clean Water Act, 2006* requires that all sources of drinking water must be assessed for vulnerability from a water quantity and water quality perspective. This chapter assesses how vulnerable the groundwater is across the region. The vulnerability of groundwater is an expression of the relative ease through which the aquifer could become contaminated by threat activities occurring on or beneath the ground surface. An aquifer that can easily become contaminated is considered to be vulnerable.

The regional groundwater vulnerability is demonstrated by delineating Significant Groundwater Recharge Areas (SGRAs), and Highly Vulnerable Aquifers (HVAs). This is a complex technical process that identifies areas that contribute water to regional aquifers (recharge areas) and to assess the vulnerability of these areas to activities at surface that may contaminate the groundwater and aquifer.

Not all Vulnerable Areas are equally vulnerable, so within these areas numeric vulnerability scores are attached to denote the Intrinsic Vulnerability in each case. Generally, the faster water is able to flow through the ground to an aquifer, the more vulnerable the area is to contamination. The vulnerability scores are determined by factors such as:

- how deep/thick the aquifer and overlying aquitard is
- what type(s) of soils are present
- how quickly water can travel through the ground
- what type of man-made transport pathways are present (i.e. improperly decommissioned wells)

The resulting vulnerability rating can then be used to delineate and score the HVAs and SGRAs within the South Georgian Bay-Lake Simcoe Source Protection Region.

This process is summarized below:

Step 1: Delineating Groundwater Vulnerability

The first step in determining both HVAs and SGRAs is to delineate the groundwater vulnerability using a methodology that will categorize vulnerability as “High”, “Medium” or “Low” as prescribed by Technical Rules 37 and 38 (MOE, 2008a), and discussed in Section 4.1.1 of Chapter 4.

Step 2: Vulnerability Scoring for Highly Vulnerable Aquifers (HVAs)

The second step is to classify the areas categorized as “High” in Step One above as Highly Vulnerable Aquifers (HVAs).

Step 3: Delineating Significant Groundwater Recharge Areas (SGRAs)

Recharge rates across the study area are determined using a surface water model (PRMS or HSP-F), which is discussed in great detail within Chapter 3 and Appendix WB-4. SGRAs were determined by using Technical Rule 44(1) (MOE, 2008a), which specifies SGRAs are the areas where the recharge is 15% greater than the average recharge across the study area.

Step 4: Vulnerability Scoring SGRAs

Using the categorized groundwater vulnerability delineated in Step One, the vulnerability within the SGRAs are categorized as “High”, “Medium” or “Low”.

Below are the results of this analysis (See Figure 3 and Figure 4).

Figure 3: Map of Highly Vulnerable Aquifers: Nottawasaga Valley Watershed

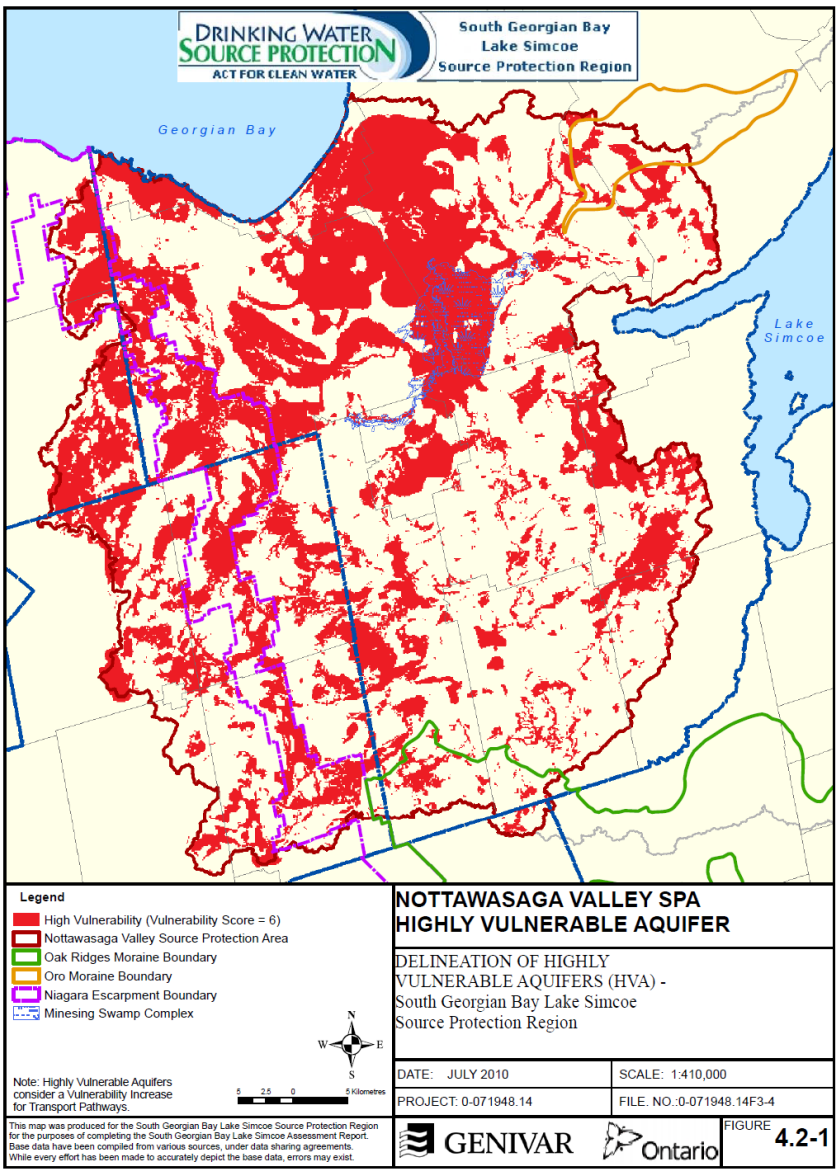
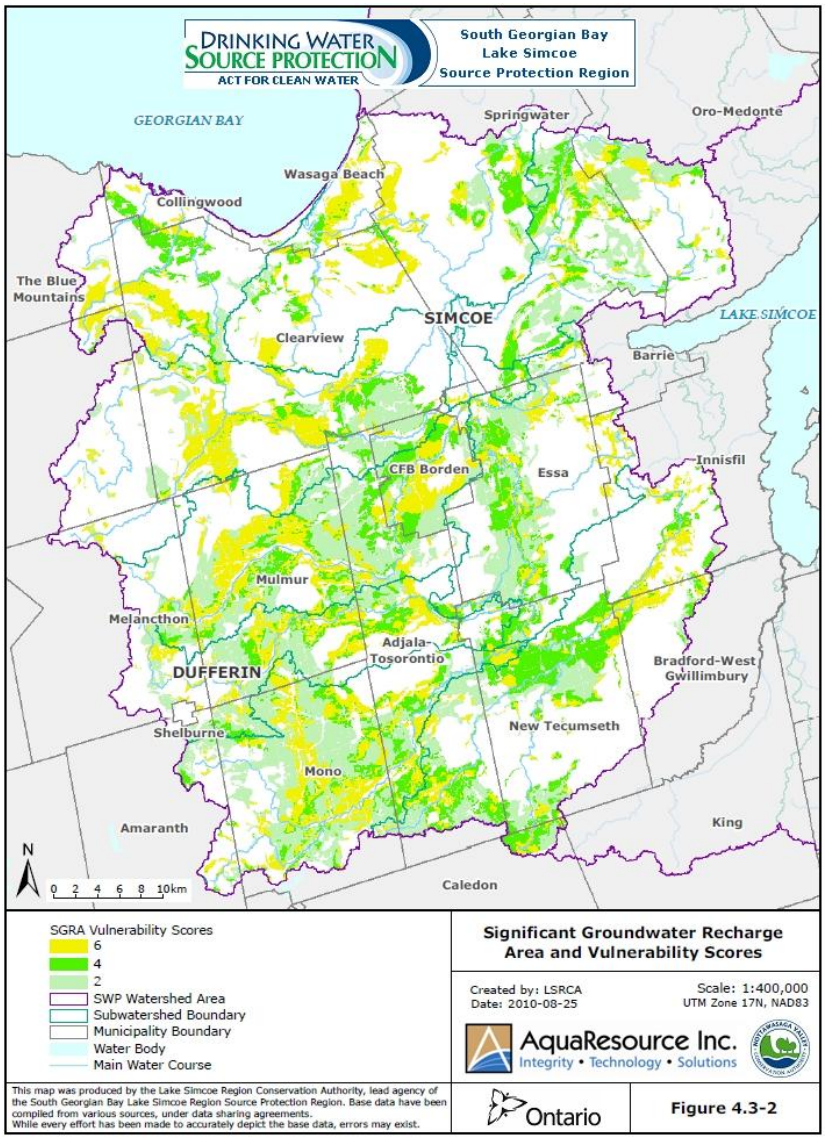


Figure 4: Significant Groundwater Recharge Areas: Nottawasaga Valley Watershed



Chapter 5: Methods Overview

This chapter provides an overview of the approaches and rules used in the South Georgian Bay-Lake Simcoe Source Protection Region to assist the reader in interpreting the municipal Vulnerability and Threats chapters that summarize the Drinking Water Threats to the South Georgian Bay Source Protection Region's 109 drinking waters systems. Assessing and reporting threats to drinking water systems can be complex and at times confusing due to the nature of work to be undertaken, the many steps involved and the rules that need to be followed. This chapter is divided into several sections. The first few sections are a brief summation on the steps taken to assess Vulnerability, Issues and Threats for groundwater and surface water systems, and are expanded on in the later sections of the chapter. The following sections include descriptions of Wellhead Protection Areas (WHPAs) and Intake Protection Zones (IPZs), as well as the methods by which they were delineated and used throughout the report. The final section of this chapter explains how Drinking Water Issues and Drinking Water Threats are evaluated and describing how areas are designated as having Significant, Moderate and/or Low Drinking Water Threats.

Chapters 6-Onwards: Threats by Municipality

6.1. Township of Adjala-Tosorontio

Drinking Water Systems and their Vulnerable Areas

There are seven drinking water systems in the Township of Adjala-Tosorontio, servicing over 4,500 people. The water supply systems are located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 8 for further details).

Colgan:

- Three wells are located in the south end of the Township and service almost approximately 2400 people
- The WHPAs extend slightly towards the south covering portions of the community

Everett:

- Three wells are located in the northern part of the Township and services over 1,500 people
- The WHPAs extend towards the west, across the nearby subdivisions

Hockley:

- One well is located in the south end of the Township and services approximately 40 people
- The WHPAs extend towards the south and therefore avoid most of the community

Lisle:

- Two wells are located in the northern end of the Township and service approximately 130 people
- The WHPAs extend southwest across the more rural sections of the community

Rosemount:

- Two wells are located in the in the central-west part of the Township and services approximately 140 people
- The WHPAs extend towards the west and across the nearby community.

Weca:

- Three wells are located in the southern end of the Township and service almost 330 people
- The WHPAs extend towards the south and therefore avoid most of the community

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemical or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- All Adjala-Tosorontio systems – No Issues

Threats (please see Table 3 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as: "an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity or any water that is or may be used as source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- No confirmed Conditions have been identified for the Adjala-Tosorontio Water Supply Systems.
- No potential Conditions have been identified for consideration at this time.

Activities

- A total of 178 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Colgan – 0 Significant Threats were identified in association with 0 land parcels.
- Everett – 1124 Significant Threats were identified in association with 103 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial.
- Hockley – 5 Significant Threats were identified in association with 5 land parcels. The Significant Threats were all related to residential land uses.
- Lisle - 21 Significant Threats were identified in association with 18 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial.
- Weca - 401 Significant Threats were identified in association with 3940 land parcels. The Significant Threats were all related to residential land uses.
- Rosemount - 287 Significant Threats were identified in association with 132 land parcels. The Significant Threats are associated with residential and agricultural land uses.

Table 3: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Adjala-Tosorontio Drinking Water Supplies have been identified, Enumeration of Significant Threats (Wellhead Protection Area)

Threat Number	Threat	Colgan Number of Parcels	Everett Number of Parcels	Hockley Number of Parcels	Lisle Number of Parcels	Weca Number of Parcels	Rosemount Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0	0	0	0	0	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	0	92	4	14	36	6
3	The application of agricultural source material to land	0	2	0	1	0	4
4	The storage of agricultural source material to land	0	0	0	1	0	0
5	The management of agricultural source material	0	0	0	0	0	0
6	The application of non-agricultural source material to land	0	0	0	0	0	0
7	The handling and storage of non-agricultural source material	0	0	0	0	0	0

Threat Number	Threat	Colgan Number of Parcels	Everett Number of Parcels	Hockley Number of Parcels	Lisle Number of Parcels	Weca Number of Parcels	Rosemount Number of Parcels
8	The application of commercial fertilizer to land	0	3	0	0	1	9
9	The handling and storage of commercial fertilizer to land	0	3	0	0	0	2
10	The application of pesticide to land	0	1~~3~~	0	1	1~~2~~	4~~3~~
11	The handling and storage of pesticide	0	3	0	0	0	2
12	The application of road salt	0	0	0	0	0	0
13	The handling and storage of road salt	0	0	0	0	0	0
14	The storage of snow	0	0	0	0	0	0
15	The handling and storage of fuel	0	2	1	1	1	1
16	The handling and storage of dense non-aqueous phase liquid	0	6	0	2	1	0
17	The handling and storage of an organic solvent	0	0	0	0	0	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0	0	0	0	0	0
19	An activity that takes water from an aquifer or a surface water body without returning	0**	0**	0**	0**	0**	0**

Threat Number	Threat	Colgan Number of Parcels	Everett Number of Parcels	Hockley Number of Parcels	Lisle Number of Parcels	Weca Number of Parcels	Rosemount Number of Parcels
	the water taken to the same aquifer or surface water body (i.e. food processing)						
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**	0**	0**	0**	0**	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0	0	0	1	0	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0	0	0	0	0
-	Total Number of Parcels*	0	103	5	18	3940	132

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.2. City of Barrie

Drinking Water Systems and their Vulnerable Areas

There is one mixed drinking water system in City of Barrie, consisting of one surface water intake and a groundwater system. The City of Barrie Water Supply System services approximately 140,000 people. Most of the system is located within the Lake Simcoe watershed. Four wells are located in the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 9 for further details).

Barrie Water Treatment Plant (WTP):

- Located on Kempenfelt Bay on the south west shore of Lake Simcoe, in the City of Barrie
- This treatment plant came in to service during the summer of 2011
- IPZ extends along southern shoreline of the City of Barrie and inland, for a short distance, along Lover's and Hewitt's Creeks.

Barrie Well Supply:

- Fourteen wells are located in the City of Barrie, just west of Kempenfelt Bay of Lake Simcoe and services around 78,500 people
- The WHPAs are complex and cover most of the city core.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogens) in the raw drinking water that will limit the ability of the water to serve as a drinking water source now, or in the future.

- Barrie WTP – No Issues
- Barrie Well Supply
  - Chloride was identified as a Drinking Water Issue for Well 3A.
  - Chloride and sodium were identified as a Drinking Water Issue for Well 11, 12 and 14.
  - Lakeshore Wells had volatile organic compounds (VOC) detections, but were not considered an official Drinking Water Issues as there was insufficient evidence.

A total of 87 Significant Threat Activities related to the Issues were identified in the WHPA. The locations where these Issues occur have been included in threats enumeration.

Threats (please see Table 4 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as "an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- Six confirmed Conditions have been identified for the Barrie Groundwater Supply.

Activities

- A total of 349~~254~~ parcels were identified as potentially having one or more Significant Threat Activities. This includes land parcels that are considered Significant due to Drinking Water Issues.

Number of Significant Threats

- Barrie WTP – No Significant Threats were identified.
- Barrie Well Supply – 452~~320~~ Significant Threats were identified in association with 349~~293~~ land parcels. Most of the Threats identified are associated with a variety land uses, with the majority associated with the handling and storage of DNAPLs.

Table 4: Number of Parcels in Lake Simcoe and Nottawasaga Valley where potential Significant Drinking Water Threats for the City of Barrie Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Area)

Threat Number	Threat	Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	12~~1~~
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	104
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0~~3~~2
9	The handling and storage of commercial fertilizer to land	1
10	The application of pesticide to land	1~~2~~
11	The handling and storage of pesticide	1
12	The application of road salt	57~~2~~
13	The handling and storage of road salt	57~~3~~
14	The storage of snow	46~~1~~
15	The handling and storage of fuel	4~~3~~
16	The handling and storage of dense non-aqueous phase liquid	167~~163~~
17	The handling and storage of an organic solvent	2~~7~~
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0

Threat Number	Threat	Number of Parcels
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	349~~293~~

Notes to table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.3. Township of Clearview

Drinking Water Systems and their Vulnerable Areas

There are six drinking water systems in the Township of Clearview, servicing over 5,300 people. The water supply systems are located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 10 for further details).

Buckingham Woods:

- Three wells are located on Lot 42, Concession 12 in the Township. This system services approximately 45 people.
- The WHPAs extend towards the west and therefore avoid most of the subdivision.

Colling-woodlands:

- Five wells are located on two wellfields and service about 150 people.
  The WHPAs extend southwestwards, avoiding most of the subdivision.

Creemore:

- Two wells are located in the community of Creemore and service around 13,000 people.
- The WHPAs extend towards the west and cover a good portion of the nearby subdivisions.

McKean Subdivision:

- Three wells are located on Lot 35, Concession 8 in the Township. This system services approximately 500 people.
- The WHPAs are long and narrow, extending in a southwestern direction, away from the subdivision.

New Lowell:

- Three wells are located on two wellfields in the community of New Lowell and service approximately 750 people.
- The WHPAs slightly extend in a southwestern direction, covering only portions of the community.

Stayner:

- Eight wells are located on three wellfields (Lot 24, Concession 1 and Lot 20, Concession 11; and 1585 Klondike Road) and service over 3,500 people and projected future population growth to 28,000 people by 2034.
- One of the WHPAs is wider and extends westwards (wells 2 and 4), while the other is long and narrow, extending south before curving west under the other Stayner WHPA (wells 1 and 3). Both extend away from the community. The Klondike wells WHPA extends southward reaching a maximum width of 2.3 km and an upgradient length of 2.8 km.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- All Clearview systems (within the Nottawasaga Valley watershed) – No Issues

Threats (please see Table 5 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as "an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- No confirmed Conditions have been identified for the Township of Clearview Water Supply systems. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 1186 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Buckingham Woods - 6 Significant Threats were identified in association with 6 land parcels. Most of the Significant Threats identified are associated with residential land uses (septic tanks, potential fuel storage for heating).

- Colling-woodlands - 15 Significant Threats were identified in association with 15 land parcels. Most of the Significant Threats identified are associated with residential land uses (septic tanks, potential fuel storage for heating).
- Creemore - 24 significant threats were identified in association with 13 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial.
- McKean Subdivision - 42 Significant Threats were identified in association with 31 land parcels. The Significant Threats reflect a variety of residential and agricultural land uses.
- New Lowell - 48 Significant Threats were identified in association with 37 land parcels. The majority of Significant Threats are associated with private septic systems.
- Stayner - 1~~9~~7 Significant Threats were identified in association with 1~~6~~4 land parcels. The Significant Threats reflect a variety of residential and agricultural land uses.

Table 5: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Clearview Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Buckingham Woods Number of Parcels	Colling-woodlands Number of Parcels	Creemore Number of Parcels	McKean Sub. Number of Parcels	New Lowell Number of Parcels	Stayner Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0	0	0	0	0	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	5	14	9	29	34	9
3	The application of agricultural source material to land	0	0	1	1	1	2~~3~~
4	The storage of agricultural source material to land	0	0	0	0	0	0
5	The management of agricultural source material	0	0	0	0	0	0
6	The application of non-agricultural source material to land	0	0	0	0	0	0

Threat Number	Threat	Buckingham Woods Number of Parcels	Colling-woodlands Number of Parcels	Creemore Number of Parcels	McKean Sub. Number of Parcels	New Lowell Number of Parcels	Stayner Number of Parcels
7	The handling and storage of non-agricultural source material	0	0	0	0	0	0
8	The application of commercial fertilizer to land	0	0	10	10	10	0
9	The handling and storage of commercial fertilizer to land	0	0	0	0	0	0
10	The application of pesticide to land	0	0	1	1	1	3~~2~~
11	The handling and storage of pesticide	0	0	0	0	0	0
12	The application of road salt	0	0	0	0	0	0
13	The handling and storage of road salt	0	0	0	0	0	0
14	The storage of snow	0	0	0	0	0	0
15	The handling and storage of fuel	1	1	1	1	2	4
16	The handling and storage of dense non-aqueous phase liquid	0	0	2	0	0	1

Threat Number	Threat	Buckingham Woods Number of Parcels	Colling-woodlands Number of Parcels	Creemore Number of Parcels	McKean Sub. Number of Parcels	New Lowell Number of Parcels	Stayner Number of Parcels
17	The handling and storage of an organic solvent	0	0	0	0	0	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0	0	0	0	0	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**	0**	0**	0**	0**	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**	0**	0**	0**	0**	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0	0	0	0	0	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0	0	0	0	0
-	Total Number of Parcels*	6	15	13	31	37	175

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.4. Town of Collingwood

Drinking Water Systems and their Vulnerable Areas

There is one drinking water system in the Town of Collingwood that services approximately 16,000 people. In addition to servicing the Town of Collingwood some water is pumped to Alliston and other parts of the Town of New Tecumseth. The water supply system is located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 11 for further details).

Collingwood WTP:

- The intake is located in Nottawasaga Bay, near the southern end of Georgian Bay (which is part of Lake Huron) in the Town of Collingwood. This system services approximately 16,000 people.
- The IPZ-1 extends for a short distance along shoreline of the Collingwood community. The IPZ-2 does not connect with shore.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemical or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Collingwood WTP - No issues

Threats (please see Table 6 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Collingwood Water Treatment Plant. No potential Conditions have been identified for consideration at this time.

Activities

- Two parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Collingwood WTP - 2 Significant Threats were identified in association with 2 land parcels. The Significant Threats are associated with the handling and storage of fuel.

Table 6: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Town of Collingwood Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	0
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	2
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**

Threat Number	Threat	Number of Parcels
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	2

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.5. Township of Essa

Drinking Water Systems and their Vulnerable Areas

There are two drinking water systems in the Township of Essa, which service approximately 7000 people. The water supply systems are located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 12 for further details).

Angus:

- Six wells are located on three wellfields in the community of Angus. This system services approximately 6,200 people.
- The WHPAs for the two southern wellfields extend slightly to the west and one to the east. The third is long and narrow, extending east before curving up in a northward direction. All aim away from the community.

Glen Ave (Thornton):

- Four wells are located on two wellfields (Glen Ave and Thornton Estates) and service almost 800 people.
- The northern WHPA extends to the east, while the southern WHPA extends out in the southeastern direction. Both avoid the majority of the nearby subdivisions.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Angus - No issues
- Glen Ave (Thornton) - No issues

Threats (please see Table 7 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a

geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- No confirmed Conditions have been identified for the Township of Essa water supply. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 32~~0~~ parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Angus - 23 Significant Threats were identified in association with 11 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial
- Glen Ave (Thornton) - 23~~1~~ Significant Threats were identified in association with 21~~19~~ land parcels. Most of the Significant Threats identified are associated with septic tanks and storage of heating fuel.

Table 7: Number of Parcels in Nottawasaga Valley where a potential Significant Drinking Water Threats for the Township of Essa Drinking Water Supply has been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Angus Number of Parcels	Glen Ave Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0	1~~0~~
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	5	16
3	The application of agricultural source material to land	2	0
4	The storage of agricultural source material to land	2	0
5	The management of agricultural source material	0	0
6	The application of non-agricultural source material to land	0	0
7	The handling and storage of non-agricultural source material	0	0
8	The application of commercial fertilizer to land	0	0
9	The handling and storage of commercial fertilizer to land.	2	0
10	The application of pesticide to land	1	1~~0~~
11	The handling and storage of pesticide	1	0
12	The application of road salt	0	0
13	The handling and storage of road salt	0	0
14	The storage of snow	0	0
15	The handling and storage of fuel	8	3
16	The handling and storage of dense non-aqueous phase liquid	1	2
17	The handling and storage of an organic solvent	1	0

Threat Number	Threat	Angus Number of Parcels	Glen Ave Number of Parcels
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0
-	Total Number of Parcels*	11	19

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.6. Town of Innisfil

Drinking Water Systems and their Vulnerable Areas

There are four drinking water systems in the Town of Innisfil, one of which is in the Nottawasaga Valley watershed and service approximately 500 people. The other three systems are located in the Lake Simcoe Watershed. Information on these systems can be found in the Lake Simcoe and Couchiching-Black River Assessment Report (Part 1).

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 13 for further details)

Churchill:

- Three wells located in the central portion of the Town of Innisfil, approximately 8 km directly south of Stroud. This system services over 500 people.
- The WHPAs extend slightly to the northeast and cover a portion of subdivisions.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogens) in the raw drinking water that will limit the ability of the water to serve as a drinking water source now, or in the future.

- All Innisfil systems (within Nottawasaga Valley watersheds) – No Issues

Threats (please see Table 8 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Innisfil Water Supplies that are within the Lake Simcoe watershed. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 19 parcels were identified as potentially having one or more Significant Threat Activities.

Number of Significant Threats

- Churchill - 304 Significant Threats were identified in association with 19 land parcels. The Significant Threats reflect a variety of residential and agricultural land uses.

Table 8: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Town of Innisfil Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Churchill Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	14
3	The application of agricultural source material to land	2
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	11
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	14
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0**
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0

Threat Number	Threat	Churchill Number of Parcels
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	2
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	19

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.7. Town of Mono

Drinking Water Systems and their Vulnerable Areas

There is one drinking water systems in the Town of Mono that services approximately 4,000 people. The water supply system is located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 19 for further details).

Cardinal Woods Subdivision:

- Five wells are located in the southwestern part of the Town of Mono and service approximately 4,000 people.
- The WHPAs extend westwards and into the CTC Source Protection Region.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Cardinal Woods Subdivision - No Issues

Threats (please see Table 9 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to be adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series or related processes that occurs within a geographical area and may be related to a particular land use. A condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Cardinal Woods water supply. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 13 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Cardinal Woods Subdivision - 14 Significant Threats were identified in association with 13 land parcels. The Significant Threats are associated with private sewage systems and storage of fuel.

Table 9: Number of Parcels in Nottawasaga Valley a potential Significant Drinking Water Threat(s) for the Town of Mono Drinking Water Supply has been identified. Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Cardinal Woods Sub. Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	12
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0

Threat Number	Threat	Cardinal Woods Sub. Number of Parcels
15	The handling and storage of fuel	2
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	Tier 3
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	Tier 3
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	13

Notes to the table above:

1. * The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total
2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.8. Township of Mulmur

Drinking Water Systems and their Vulnerable Areas

There is one drinking water systems in the Township of Mulmur that services around 450 people. The water supply system is located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 18 for further details).

Mansfield:

- Three wells are located in the Township of Mulmur, approximately 20 km north of the Town of Orangeville. This system services around 450 people.
- The WHPAs extend westwards and into the CTC (Credit Valley, Toronto & Region and Central Lake Ontario) Source Protection Region.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Mansfield - No Issues

Threats (please see Table 10 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to be adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series or related processes that occurs within a geographical area and may be related to a particular land use. A condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Mansfield water supply. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 33 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Mansfield - 46~~7~~ Significant Threats were identified in association with 33 land parcels. The Significant Threats identified are associated with residential and agricultural land uses.

Table 10: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threat(s) for the Township of Mulmur Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Mansfield Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	24
3	The application of agricultural source material to land	2
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	11
9	The handling and storage of commercial fertilizer to land	1
10	The application of pesticide to land	1~~2~~
11	The handling and storage of pesticide	1
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	6
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**

Threat Number	Threat	Mansfield Number of Parcels
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	*Total Number of Parcels	33

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.9. Town of New Tecumseth

Drinking Water Systems and their Vulnerable Areas

There are three drinking water systems in the Town of New Tecumseth that service approximately 30,900 people. The water supply systems are located within the Nottawasaga Valley Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 14 for further details).

Alliston:

- Six wells are located in the northwest corner of the Town of New Tecumseth in the community of Alliston. This system services approximately 26,000 people.
- The WHPAs extend towards the both south and west covering a large portion of the community, though avoiding most of the more densely populated areas.

Hillcrest Subdivision:

- One well is located in the northwest corner of the Town of New Tecumseth in the community of Alliston. This system services 0 people (is a standby well – back up for the Town of Alliston)
- The WHPAs extend towards the west and therefore avoids most of the community.

Tottenham:

- Four wells are located in the southwest part of the Town of New Tecumseth in the community of Tottenham. This system services approximately 4,800 people.
- The WHPAs extend to the south and cover a large portion of the community.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Alliston - No Issues
- Hillcrest Subdivision - No Issues
- Tottenham - No Issues

Threats (please see Table 11 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as "an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- No confirmed Conditions have been identified for the New Tecumseth. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 9637 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Alliston and Hillcrest Subdivision - 8352 Significant Threats were identified in association with 3726 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial
- Tottenham - 1713 Significant Threats were identified in association with 131 land parcels. The majority of Significant Threats are associated with the potential handling and storage of Dense Non-Aqueous Phase Liquids (DNAPLs).

Table 11: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of New Tecumseth Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Alliston/ Hillcrest Number of Parcels	Tottenham Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	20	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	1617	2
3	The application of agricultural source material to land	66	1
4	The storage of agricultural source material to land	2	0
5	The management of agricultural source material	0	0
6	The application of non-agricultural source material to land	0	0
7	The handling and storage of non-agricultural source material	0	0
8	The application of commercial fertilizer to land	23	0
9	The handling and storage of commercial fertilizer to land	11	0
10	The application of pesticide to land	47	1
11	The handling and storage of pesticide	10	20
12	The application of road salt	80	20
13	The handling and storage of road salt	80	0
14	The storage of snow	80	0
15	The handling and storage of fuel	8	2
16	The handling and storage of dense non-aqueous phase liquid	6	7
17	The handling and storage of an organic solvent	0	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0	0

Threat Number	Threat	Alliston/ Hillcrest Number of Parcels	Tottenham Number of Parcels
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	2	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0
-	Total Number of Parcels*	37~~26~~	1~~3~~1

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.10. Township of Oro-Medonte

Drinking Water Systems and their Vulnerable Areas

There are 11 drinking water systems in the Township of Oro-Medonte, one of which is located in the Nottawasaga Valley watershed and services approximately 120 people, and anticipates to serve 750 more. Five systems are located in the Lake Simcoe watershed, and the remaining five systems are located in the Severn Sound watershed. Information on these systems can be found in the Lakes Simcoe and Couchiching-Black River Assessment Report (AR) and Severn Sound AR, respectively.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well (See Chapter 15 for further details).

Craighurst:

- Four wells are located in the west-central part of the Township of Oro-Medonte, approximately 13 km north of Barrie. This system services over 120 people, and anticipates to serve 750 more.
- The WHPAs extend towards the east and therefore avoid most of the community.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogens) in the raw drinking water that will limit the ability of the water to serve as a drinking water source now, or in the future.

- Craighurst - No Issues

Threats (please see Table 12 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Oro-Medonte Water Supplies that are within the Lake Simcoe watershed. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 30 parcels were identified as potentially having one or more Significant Threat Activities.

Number of Significant Threats

- Craighurst - 30 Significant Threats were identified in association with 30 land parcels. The majority of Significant Threats are associated with residential land uses (septic systems, potential storage of fuel).

Table 12: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Township of Oro-Medonte Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Craighurst Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	20
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	9
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**

Threat Number	Threat	Craighurst Number of Parcels
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	30

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.11. Regional Municipality of Peel

Drinking Water Systems and their Vulnerable Areas

There are eight drinking water systems in the Regional Municipality of Peel, one of which is in the South Georgian Bay-Lake Simcoe Source Protection Region. The Palgrave Water Supply System is part of the Palgrave-Caledon East Drinking Water System. It consists of three groundwater supply wells (PAL2, PAL3, and PAL4) with one municipal well (PAL3) located in the Nottawasaga Valley watershed. The system services a population of 76,581. The other systems within Peel are located in the Credit Valley, Toronto and Region, Central Lake Ontario (CTC) Source Protection Region.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 7 for further details).

Palgrave:

- One well (Well 3) is located on Mount Hope Road in the Village of Palgrave, to the southwest of Lake Simcoe. There are two other wells in the system, but they are located within the CTC Source Protection Region.
- The WHPAs extend northwards, across a large portion of the nearby communities. The WHPAs from Well 3 also cross into the CTC Source Protection Region.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemical or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Palgrave - No issues

Threats (please see Table 13 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Palgrave system. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 4 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Palgrave - 5 Significant Threats were identified in association with 4 land parcels. The Significant Threats identified are associated with septic systems and the handling and storage of fuel.

Table 13: Number of Parcels in Nottawasaga Valley where potential Significant Drinking Water Threats for the Peel Region Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Palgrave Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	3
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	1~~0~~
16	The handling and storage of dense non-aqueous phase liquid	0
17	The handling and storage of an organic solvent	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**

Threat Number	Threat	Palgrave Number of Parcels
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	4

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.12. Town of Shelburne

Drinking Water Systems and their Vulnerable Areas

There is one drinking water systems in the Town of Shelburne servicing approximately 8200 people. The water supply system is located within the Nottawasaga Valley Source Protection Area and also in the Grand River Source Protection Area.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 6 for further details).

Shelburne:

- PW1 is located in the central part of town, south of Main Street whereas PW3 is located north of Main Street in the west part of the Town.
- PW5/6 are located east of the 4th Line, just north of highway 89.
- PW7/8 are located in the Township of Melancthon in the Grand River Source Protection Area.
- The WHPAs extend to the west and cross over into the Lake Erie Source Protection Region

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Shelburne - No issues

Threats (please see Table 14 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to be adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series or related processes that occurs within a geographical area and may be related to a particular land use. A condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- One confirmed Condition has been identified for the Shelburne water supply and one potential Condition has been identified for consideration at this time.

Activities

- A total of 66 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Shelburne - 70~~66~~ Significant Threats were identified in association with 66 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial.

Table 14: Number of Parcels in Nottawasaga Valley parcels where potential Significant Drinking Water Threat(s) for the Town of Shelburne Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Shelburne Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	13
3	The application of agricultural source material to land	7
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	7
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	3
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	7~~3~~
11	The handling and storage of pesticide	0
12	The application of road salt	0
13	The handling and storage of road salt	0
14	The storage of snow	0
15	The handling and storage of fuel	18
16	The handling and storage of dense non-aqueous phase liquid	9
17	The handling and storage of an organic solvent	1
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**

Threat Number	Threat	Shelburne Number of Parcels
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	1
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	66

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.13. Township of Springwater

Drinking Water Systems and their Vulnerable Areas

There are nine drinking water systems in the Township of Springwater, seven of which are in the Nottawasaga Valley watershed and service over 14, 228~~7,500~~ people. The other two systems are located in the Severn Sound watershed. Information of these systems can be found in the Severn Sound Assessment Report.

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 16 for further details).

Anten Mills:

- Three wells are located at Lot 1, Concession 7 in the Township. This system services over 650 people.
- The WHPAs extend towards the northeast and therefore avoid most of the community.

Del Trend Subdivision:

- Three wells are located at Lot 16, Concession 4 in the Township. This system services about 611 people.
- The WHPAs extend towards the northeast and therefore avoid most of the subdivision. This WHPA overlaps with the south Midhurst WHPA.

Midhurst:

- Six wells are located in the four wellfields in the Township and service around 6,040 people.
- Two WHPAs extend east, while the other (overlapped with Del Trend) extends northeast. A portion of the community is in the WHPAs.
- The WHPAs for Midhurst Valley wells 1 and 2 cover an area of approximately 6.4 km^2 and extends in an easterly direction form the wells.

Minesing:

- Four wells are located on Ronald Road and service over 600 people.
- The WHPAs extend towards the east, avoiding most of the community.

Phelpston:

- Two wells are located in on Lot 10, Concession 5 in the Township. This system services approximately 270 people.
- The WHPA extend towards the east away from most of the community.

Snow Valley Highlands:

- Four wells are located at 2602 George Parkway and 29A Eder Trail, in the Township. This system services approximately 1,197 people
- The WHPA curves down in a southwestern direction, avoiding most of the surrounding community.

Vespra Downs Subdivision:

- Two wells are located at 13 Parr Boulevard, in the Township, and service about 540 people.
- The WHPA is long and narrow, curving up northwards away from the subdivision.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemicals or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- All Springwater systems (within the Nottawasaga Valley watershed) – No Issues

Threats (please see Table 15 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as "an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities."

Conditions

- No confirmed Conditions have been identified for the Springwater Water Supplies within the Severn Sound watershed. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 109 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Anten Mills - 20 Significant Threats were identified in association with 20 land parcels. All of the Significant Threats identified are associated with septic tanks and storage of heating fuel.
- Del Trend Subdivision - 4 Significant Threats were identified in association with 4 land parcels. All of the Significant Threats identified are associated with septic tanks and storage of heating fuel.
- Midhurst - 47 Significant Threats were identified in association with 45 land parcels. All of the Significant Threats identified are associated with septic tanks and storage of heating fuel, DNAPLs, and the establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage, including septic tanks
- Minesing - 8 Significant Threats were identified in association with 8 land parcels. All of the Significant Threats identified are associated with septic tanks and the storage of heating fuel.
- Phelpston - 17 Significant Threats were identified in association with 12 land parcels. Most of the Significant Threats identified are associated with residential and agricultural land uses.
- Snow Valley Highlands – 18 Significant Threats were identified in association with 18 land parcels. All of the Significant Threats identified are associated with septic tanks and storage of heating fuel.
- Vespra Downs Subdivision - 10 Significant Threats were identified in association with 10 land parcels. Most of the Significant Threats identified are associated with septic tanks and storage of heating fuel.

Table 15: Number of Parcels in Nottawasaga Valley where a potential Significant Drinking Water Threats for the Township of Springwater Drinking Water Supply have been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Anten Mills Number of Parcels	Del Trend Sub. Number of Parcels	Midhurst Number of Parcels	Minesing Number of Parcels	Phelpston Number of Parcels	Snow Valley Highlands Number of Parcels	Vespra Downs Sub. Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0	0	0	0	0	0	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	19	3	35	7	9	15	8
3	The application of agricultural source material to land	0	0	0	0	1	0	0
4	The storage of agricultural source material to land	0	0	0	0	0	0	0
5	The management of agricultural source material	0	0	0	0	0	0	0
6	The application of non-agricultural source material to land	0	0	0	0	0	0	0

Threat Number	Threat	Anten Mills Number of Parcels	Del Trend Sub. Number of Parcels	Midhurst Number of Parcels	Minesing Number of Parcels	Phelpston Number of Parcels	Snow Valley Highlands Number of Parcels	Vespra Downs Sub. Number of Parcels
7	The handling and storage of non-agricultural source material	0	0	0	0	0	0	0
8	The application of commercial fertilizer to land	0	0	0	0	4	0	0
9	The handling and storage of commercial fertilizer to land	0	0	0	0	0	0	0
10	The application of pesticide to land	0	0	0	0	1	0	0
11	The handling and storage of pesticide	0	0	0	0	0	0	0
12	The application of road salt	0	0	0	0	0	0	0
13	The handling and storage of road salt	0	0	0	0	0	0	0
14	The storage of snow	0	0	0	0	0	0	0
15	The handling and storage of fuel	1	1	5	1	1	2	1
16	The handling and storage of dense non-aqueous phase liquid	0	0	6	0	1	1	1
17	The handling and storage of an organic solvent	0	0	0	0	0	0	0
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0	0	0	0	0	0	0

Threat Number	Threat	Anten Mills Number of Parcels	Del Trend Sub. Number of Parcels	Midhurst Number of Parcels	Minesing Number of Parcels	Phelpston Number of Parcels	Snow Valley Highlands Number of Parcels	Vespra Downs Sub. Number of Parcels
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**	0**	0**	0**	0**	0**	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**	0**	0**	0**	0**	0**	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0	0	0	0	0	0	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0	0	0	0	0	0
-	Total Number of Parcels*	20	4	45	8	12	18	10

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

6.14. Town of Wasaga Beach

Drinking Water Systems and their Vulnerable Areas

There is one drinking water system in the Town of Wasaga Beach that services approximately 16,000 people. The water supply system is located within the Nottawasaga Valley Source Protection Area

Areas that are vulnerable to contamination have been delineated, these are known as Wellhead Protection Areas (WHPA) for wells and Intake Protection Zones (IPZ) for surface water intakes. A WHPA is the area around the wellhead where land use activities have the greatest potential to affect the quality of the water flowing into the well. An IPZ is the area of water and land where activities have the potential to affect the quality of water being taken up by the surface water intake (See Chapter 17 for further details).

Wasaga Beach:

- Seven wells are located in the Town of Wasaga Beach, near the shore of Nottawasaga Bay (southern end of Georgian Bay). This system services approximately 16,000 people
- The WHPAs extend outwards slightly to the south and east, covering a good portion of the community.

Issues

The intent of the Issues Evaluation is to identify parameters (e.g. chemical or pathogen) in the raw drinking water that will limit the ability of the water to serve as a drinking water source either now, or in the future.

- Wasaga Beach - No Issues

Threats (please see Table 16 below for full list of threats for each Drinking Water System)

A Drinking Water Threat is defined as “an Activity, or Condition that adversely affects or has the potential to adversely affect, the quality and quantity of any water that is or may be used as a source of drinking water. An Activity is one or a series of related processes that occurs within a geographical area and may be related to a particular land use. A Condition refers to the presence of a contaminant in the soil, sediment, or groundwater resulting from past activities.”

Conditions

- No confirmed Conditions have been identified for the Wasaga Beach water supply. No potential Conditions have been identified for consideration at this time.

Activities

- A total of 12 parcels were identified as potentially having one or more Significant Threat activities.

Number of Significant Threats

- Wasaga Beach - 153 Significant Threats were identified in association with 12 land parcels. The Significant Threats reflect a variety of land uses, from residential to agriculture to commercial

Table 16: Number of Parcels where a potential Significant Drinking Water Threats for the Town of Wasaga Beach Drinking Water Supply has been identified, Enumeration of Significant Threats (Wellhead Protection Areas)

Threat Number	Threat	Wasaga Beach Number of Parcels
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V or the Environmental Protection Act	0
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	3
3	The application of agricultural source material to land	0
4	The storage of agricultural source material to land	0
5	The management of agricultural source material	0
6	The application of non-agricultural source material to land	0
7	The handling and storage of non-agricultural source material	0
8	The application of commercial fertilizer to land	0
9	The handling and storage of commercial fertilizer to land	0
10	The application of pesticide to land	0
11	The handling and storage of pesticide	0
12	The application of road salt	2~~0~~
13	The handling and storage of road salt	2~~0~~
14	The storage of snow	1~~0~~
15	The handling and storage of fuel	1
16	The handling and storage of dense non-aqueous phase liquid	9
17	The handling and storage of an organic solvent	0

Threat Number	Threat	Wasaga Beach Number of Parcels
18	The management of runoff that contains chemicals used in the de-icing of aircraft	0
19	An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body (i.e. food processing)	0**
20	An activity that reduces the recharge of an aquifer (i.e. increase in impervious surface)	0**
21	The use of land as livestock grazing or pasturing land, and outdoor confinement area, or a farm-animal yard	0
22	The establishment and operation of a liquid hydrocarbon pipeline	0
-	Total Number of Parcels*	12

Notes to the table above:

1.* The total number of parcels accounts for the fact that some parcels may have more than one Significant Threat and have been counted once in the overall total

2. 0** indicates the system did not advance to Tier 3; therefore, no risk to water quality

8 The Assessment Report in Context: Final Chapter

Climate Change

Over the past twenty years, there has been a great deal of concern around the world over climate change, its causes and potential impacts on humans and the environment. One of the potential impacts of climate change will be related to water supply. It is; therefore, important to look at climate change in the context of Source Water Protection.

Climate change can change both the quality and quantity of drinking water sources. Warmer temperatures can raise the temperature of surface water sources creating ideal habitats for bacterial growth. Warmer temperatures also indicate that more evaporation and evapotranspiration will be occurring. The increased evaporation rates mean that less water is available to infiltrate the ground, to recharge the groundwater system. An increased frequency in storm events inherently leads to an increase in runoff, potentially introducing harmful pollutants to watercourses. Other potential impacts of climate change are introduced throughout this Chapter. Climate change has the potential to broadly impact many areas of our life, from agriculture to recreation and animal habitat to forest cover. Understanding how climate change has the potential to affect our water sources is imperative in protection of the resource for future generations.

Table 17 and Table 18 show how climate change is anticipated to impact the region's air temperature and precipitation.

Table 17: Greenhouse Gas (GHG) Emission Scenarios: Summary of projected increase in Source Protection Region average annual temperature (°C) in the 2050s compared with 1961-1990

Season	GHG Emmision Scenario Low (°C)	GHG Emmision Scenario Medium (°C)	GHG Emmision Scenario High (°C)
Annual	2.3	2.7	3.0
Winter	2.5	3.0	3.4
Spring	2.2	2.5	2.8
Summer	2.2	2.6	2.9
Autumn	2.3	2.6	2.8

Table 18: Greenhouse Gas (GHG) Emission Scenarios: Summary of projected increase in Source Protection Region precipitation (%) in the 2050s compared with 1961-1990

Season	GHG Emmision Scenario: Low (%)	GHG Emission Scenario: Medium (%)	GHG Emission Scenario: High (%)
Annual	5.15	5.45	5.51
Winter	9.38	10.19	10.76
Spring	8.58	9.1	9.65
Summer	0.92	0.11	-0.62
Autumn	3.06	3.79	3.82

The projected increase in air temperature, winter precipitation, storm intensity and frequency are some of the effects of climate change that could change the quantity of water available for surface intakes and well supplies.

Summer groundwater recharge rates could be reduced as a result of the projected increased intensity of summer storm events, causing more water too runoff at the surface. Reduced recharge to groundwater could cause a significant decline in aquifer levels. This could result in shallow wells drying up and/or municipal wells needing to be drilled deeper into the aquifer, or find an alternate source of water to sustain consumption rates. On the other hand, warmer conditions in the fall and winter will delay ground frost; therefore, enhancing infiltration during wet months. Similarly, an earlier spring will allow for more infiltration to occur, as the winter snowpack thaws.

Average annual precipitation is projected to increase by 5%, and the pattern of fall is predicted to change to fewer, more intense storms. Flooding puts a strain on existing storm sewers, with most pipes designed to accommodate a 25-year storm event, but it is highly likely that there will be many more storms exceeding this intensity. In Ontario alone, there were ten 100-year storm events that occurred between the years 2000 to 2005. Upgrades may be necessary to avoid flooding such as that observed in Barrie in 2005, Newmarket in 2006, Angus in 2008, and Coldwater in 2009.

In addition to concerns about the quantity of water available, climate change may have an impact on the quality of water as well. Increased severity and frequency of weather events may lead to more accidental releases of contaminants due to factors such as:

- damage to buildings or infrastructure housing contaminants resulting in their release
- overflow of retention areas – some activities rely on retention areas to hold contaminants until they can be processed (for example waste treatment facilities or storm management ponds), during extreme events the capacity of the retention areas may be exceeded due to the volume of water entering, leading to overflow and contamination of local waterways
- mobilization of surface contaminants – in many cases a contaminant may not be considered a hazard as it is relatively immobile. However, with sufficient surface flow or flooding these, contaminants can be transported into local waterways where they impact water quality

How the Great Lakes Were Considered

Section 14 of the *Clean Water Act, 2006* requires that if a Source Protection Area contains water that flows into the Greats Lakes a consideration of the following documents must occur during the completion of Assessment Reports and Source Protection Plans. The documents are as follows:

1. The Great Lakes Water Quality Agreement of 1978 between Canada and the United States of America signed at Ottawa on November 22, 1978, including any amendments made before or after this section comes into force.
2. The Great Lakes Charter signed by the premiers of Ontario and Quebec and the governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin on February 11, 1985, including any amendments made before or after this section comes into force.
3. The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem 2002 entered into between Her Majesty the Queen in Right of Canada and Her Majesty the Queen in Right of Ontario, effective March 22, 2002, including any amendments made before or after this section comes into force.
4. Any other agreement to which the Government of Ontario or the Government of Canada is a party that relates to the Great Lakes Basin and that is prescribed by the regulations. 2006, c.22, s.14 (1).

Within the South Georgian Bay-Lake Simcoe Source Protection Region (SGBLS SPR) all three Source Protection Authorities have waters which drain directly into the Great Lakes. For further information on how the Great Lakes agreements were considered in the work undertaken to complete the Assessment Report, please refer to the respective chapter within the Report.

Additional Items Raised by the Source Protection Committee

Committee has the authority to request additional information be included or excluded within the Assessment Report. The following points describe areas where the Technical Rules explicitly state that a SPC ruling is required:

- Technical Rule 119: The intent of Technical Rule 119 is to enable the SPC to include activities that are not prescribed in Part XII of the Technical Rules (December 2021) in the assessment. To be considered by the Director any activity has to be identified as a potential threat to a drinking water system.
    - At this stage the SPC has not requested additional activities be considered, however, as noted below a number of activities have been identified that may be considered for future versions.
- Technical Rule 15.1: Use of alternate methods or approaches for gathering information or for performing tasks that depart from those described in the rules (Rule 15.1). The following alternate methods were requested and approved under this rule.
    - Rules require a separate 1km^2 grid for each Source Protection Area when determining the total impervious surface area. Alternate method approved by the Director allows a single grid to be used for the entire Source Protection Region.
    - Rules require livestock numbers to be calculated by interpreting aerial photography to estimate the capacity of a farm to house livestock. Alternate method approved by the Director allows livestock density to be determined using Census of Canada livestock data within the Source Protection Region, with the census data of actual animal numbers being converted to nutrient units for the use of the calculations. This method was used to assess the livestock density for regional vulnerable areas (HVA and SGRA) only, while drinking water system vulnerable areas were assessed using the prescribed approach.
    - Rules require that the vulnerability of the groundwater within a source protection area be assessed using one or more of the four prescribed methods. Alternate method approved by the Director allows the consideration of local scale features such as ‘windows’ in the confining unit, which are not always accounted for in the regional nature of the AVI scoring. This includes the use of water quality information as a verification tool to reassess the groundwater vulnerability in the WHPAs and determine where the groundwater vulnerability should be amended. This alternative method was used in the City of Barrie, Township of Essa and the Town of Wasaga Beach.

Letters with Director's Approval for the above-mentioned Rule changes are available in Appendix ARC.

- Species at Risk assessment should only be included if the SPC is of the opinion that the watershed characterization should include a discussion for the purposes of informing the public about species at risk in the Source Protection Area.
    - The SPC carried the motion that Species at Risk should not be included in the Assessment Report.

Throughout the process of completing the Assessment Report members of the SPC have also identified a number of items that do not directly fit within the Assessment Report framework but do warrant mention. These items are:

- Proposed Site 41 Landfill Site
- Contaminants treated at a water supply facility may not be identified as an Issue
- Large quarry proposal in Dufferin County
- Transportation Corridors (Roads and Highways)

Information on these items can be found in the respective chapter within the Assessment Report.

9 Moving Towards Source Protection Plans

The Assessment Reports will be the basis for the next stage of the Source Protection process – developing Source Protection Plans and making local policy decisions for protecting the quality and quantity of drinking water. Source Protection Plans will outline how significant threats are to be mitigated. It builds on the science of the Assessment Report and the input from stakeholders and residents. Plans will be a powerful tool to make sure that our water is protected forever. It will dictate the methods by which all the different threats identified can be made less harmful. It will also put policies in place to make sure that if no threat exists, that it never can. It protects our health and our environment from the overuse of water supplies. You are encouraged to follow the development of the SGBLSR's Source Protection Plans over the next two years.

List of Acronyms

Acronym	Description
ADCP	Acoustic Doppler Current Profiler
AES	Atmospheric Environment Service
AET	Actual Evapotranspiration
AO	Aesthetic Objective
ANSI	Areas of Natural and Scientific Interest
AR	Assessment Report
ASM	Agricultural Source Material
AVI	Aquifer Vulnerability Index
BMP	Best Management Practices
CA	Conservation Authority
CAMC- YPDT	Conservation Authorities Moraine Coalition- York, Peel, Durham, Toronto
CWA	*Clean Water Act, 2006*
CWB	Conceptual Water Budget
DNAPLS	Dense Non-Aqueous Phase Liquids
DWSP	Drinking Water Source Protection
ELC	Ecological Land Classification
ET	Evapotranspiration
GIS	Geographic Information System

GAC	Granular Activated Carbon
GHG	Greenhouse Gas
GW	Groundwater
GUDI	Groundwater Under the Direct Influence of Surface Water
HVA	Highly Vulnerable Aquifer
HYDAT	Hydrometric Data
HWM	High Water Mark
ICA	Issues Contributing Area (Now, WHPA-ICA or IPZ- ICA)
IPZ	Intake Protection Zone
IPZ-ICA	Intake Protection Zone – Issue Contributing Area
ISI	Intrinsic Susceptibility Index
LIO	Land Information Ontario
LIS	Laurentide Ice Sheet
LSRCA	Lake Simcoe Region Conservation Authority
LSEMS	Lake Simcoe Environmental Management Strategy
mASL	Metres above sea level
mbgs	Metres below ground surface
MECP	Ministry of the Environment, Conservation and Parks (Previously, the Ministry of the Environment [MOE])
MNR	Ministry of Natural Resources

Formatted: Font: Bold

Formatted: Font: Bold

MOE	Ministry of the Environment (Now, the Ministry of the Environment, Conservation and Parks [MECP]
MOE LUT	Ministry of the Environment Look Up Table
MOVE.1	Maintenance of variance extension type 1 (linear regression method)
MPAC	Municipal Property Assessment Corporation
MW	Municipal Well
NAICS	North America Industrial Classification System
NASM	Non Agricultural Source Material
NVCA	Nottawasaga Valley Conservation Authority
ODWS	Ontario Drinking Water Standards
OMNR	Ontario Ministry of Natural Resources
OGS	Ontario Geological Society
PCB	Polychlorinated Biphenyls
PGMN	Provincial Groundwater Monitoring Network
PTTW	Permit To Take Water
PWQMN	Provincial Water Quality Monitoring Network
PWQO	Provincial Water Quality Objectives
QCP	Quality Control Program
SCS	Soil Conservation Science
SGBLS	South Georgian Bay Lake Simcoe

SGBWLS	South Georgian Bay West Lake Simcoe
SGRA	Significant Groundwater Recharge Area
SSEA	Severn Sound Environmental Association
SSGW	South Simcoe Groundwater Study
SPA	Source Protection Area
SPC	Source Protection Committee
SPR	Source Protection Region
STP	Sewage Treatment Plant
SWP	Source Water Protection
SWAT	Surface to Well Advection Time
SW	Surface Water
TAC	Thorncliffe Aquifer Complex
TCC	Trent Conservation Coalition
TCE	Trichloroethylene
TR	Technical Rules
ToR	Terms of Reference
TOT	Time of Travel
TSSA	Technical Standards and Safety Authority
TWCA	Total Water Contributing Area
UTM	Universal Transverse Mercator
WHPA	Wellhead Protection Area

WSC	Water Survey of Canada
WSS	Water Supply System
WTP	Water Treatment Plant
WWIS	Water Well Information System