

Chapter 1: Introduction

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1 Introduction

1.1 Drinking Water Source Protection and *The Clean Water Act, 2006*

“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, led by the Ministry of the Environment and by the Conservation Authorities (where appropriate), and involving local actors. The purpose is to develop a source protection plan for each watershed in the province...”

- Justice Dennis O'Connor, The Walkerton Inquiry, 2002

The Clean Water Act, 2006 (CWA) received Royal Assent on October 19, 2006 and 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 for generations to come.

The catalyst for the CWA was the Walkerton tragedy of May 2000, when the town’s water system became contaminated with deadly bacteria, primarily *Escherichia coli* O157:H7.1 (*E. coli*). Seven people died, and more than 2,300 became ill. The government of Ontario responded by calling an Inquiry – The Walkerton Commission of Inquiry. The inquiry and its reports were divided into two parts. The first pertains only to the events in Walkerton, and focuses on the circumstances that caused the outbreak including the systemic errors and oversights which led to the outbreak. The second goes beyond the events in Walkerton, and looks into other matters necessary to ensure the safety of Ontario’s drinking water. Justice Dennis O’Connor set out the concept of the multi-barrier approach to safe drinking water, emphasizing the protection of source water supplies in Ontario’s lakes, rivers and aquifers. This is the first barrier in safe drinking water. Source protection is followed by the other components of the multi-barrier approach: effective water treatment, secure distribution systems, monitoring programs, and response to adverse test results. Our drinking water is among the safest in the world and conventional water treatment can remove many potential contaminants that can result in illness and even death. Source Protection, however, is about identifying possible threats to drinking water, assessing the risks of those threats, mitigating them and planning ahead to prevent contamination before it gets into our water supply. It is a responsible and effective way of ensuring safe, clean drinking water and avoiding serious health issues.

By passing the *Clean Water Act* in 2006, and implementing Justice O'Connor's recommendations on Source Water Protection, the government made a commitment to the citizens of Ontario to safeguard drinking water by protecting its quality and quantity so that a tragedy such as Walkerton will not happen again. Locally, the South Georgian Bay–Lake Simcoe (SGBLS) Source Protection Committee has been working with partners, stakeholders and residents to fulfill the requirements of the CWA.

1.2 The Source Water Protection Process

The Source Water Protection process, as established within the CWA and resulting regulations, is a four-stage process. The information that needs to be included in the Assessment Report, and how it will be assessed, is prescribed within the Technical Rules (MOE, 2008a) in addition to the CWA and associated regulations. Once the draft Assessment Report was completed it was required to undergo two periods of public consultation before being submitted to the Province. Following the completion of the Assessment Report, Source Protection Plans will be developed and implemented in the following years.

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

1.2.1 The First Stage

The first stage of the process, established the Source Protection Areas, Source Protection Authorities and the multi-stakeholder Source Protection Committee - these are all described in more detail below. Once these were established, the preparation and approval of the Terms of Reference (ToR) for each Source Protection Area was initiated. The Terms of Reference documents are essentially the work plans to be followed, and describe:

1. The technical projects or tasks required to develop an understanding of the Vulnerable Areas and Threats to drinking water sources
2. The projects or tasks required to develop land use planning policies, risk reduction strategies, and monitoring activities that will be recommended in the Source Protection Plans
3. The consultation efforts with stakeholders and the public on the development and results of the technical and planning products completed
4. Whether the tasks from 1, 2 and 3 above will be coordinated by municipalities, Source Protection/Conservation Authority staff, or some combination thereof (a partnership)
5. Cost estimates and timelines for task completion

The Terms of Reference documents for the South Georgian Bay-Lake Simcoe Region were approved by the Ministry of the Environment (Now the Ministry of Environment, Conservation and Parks (MECP)) on June 29 and July 13, 2009.

1.2.2 The Second Stage

The second stage of the process was to prepare and submit an Assessment Report for each Source Protection Area to the Director of the Source Protection Programs Branch within 12 months of the approval of the Terms of Reference. However, due to a number of technical and project management challenges, it was not possible to complete the Assessment Report by the July 13, 2010 submission date. An extension request was submitted to Director of the Source Protection Programs Branch, for an approval for submission on December 17, 2010 granted.

This is the Nottawasaga Valley Assessment Report. It describes both the vulnerability of municipal drinking water systems to quality and quantity stresses, as well as categorizes and lists human activities that could be significant threats to drinking water.

There are four (4) types of Vulnerable Areas considered in the Assessment Report. Two are directly associated with municipal drinking water systems and two are on a regional (landscape) scale and don't pertain directly to any particular drinking water system. The two Vulnerable Areas directly associated with a drinking water system are called Wellhead Protection Areas (WHPA) and Intake Protection Zones (IPZ):

- A WHPA is the area around a wellhead where land use activities have the greatest potential to affect the quality of water that flows into the well.
- Similarly, an IPZ is the area around a surface water intake.

The two regional scale Vulnerable Areas are Significant Groundwater Recharge Areas (SGRAs) and Highly Vulnerable Areas (HVAs):

- Recharge Areas are areas where water enters an aquifer (underground reservoirs from which we draw our water) through the ground. Recharge areas are significant when they supply more water to an aquifer than the land around it. Significant Recharge areas are an important area on the landscape for ensuring a sufficient amount of water enters an aquifer. For example, paving over a SGRA would prevent water from getting into the ground to recharge an aquifer, potentially decreasing the amount of water available.
- Highly Vulnerable Aquifers (HVAs) are those areas where an aquifer may be more prone to contamination. These areas have been identified where there is little or no protection from an overlying aquitard (a protective layer of low permeable materials). Generally, the faster water is able to flow through the ground to an aquifer, the more vulnerable the area is to contamination. For example, a fuel spill would get into an aquifer much more quickly where a HVA has been identified than where one has not.

Once the Vulnerable Areas were delineated, their vulnerability is determined. Not all Vulnerable Areas are equally vulnerable, so numeric scores are attached to denote the Intrinsic Vulnerability in each case. Following this, the Threats to the drinking water system in those areas must be identified. The identification of potential Threats occurs through two processes – Threats Assessment and Issues Evaluation. Threats Assessment requires identification of **Activities** and **Conditions** which are a potential threat to water. In the context of Source Water Protection, these terms have very specific meanings. **Activities** are existing land uses in a Vulnerable Area that may be a significant risk to the water supply (i.e. an underground fuel storage tank, or the spreading of pesticides), whereas **Conditions** are defined as contamination from past activities that may be a significant risk (i.e. Brownfield site). An Issue is essentially an

existing contamination of the raw water supply. If an Issue is found in a system, the Threats (Activities and Conditions) causing the Issue must be identified. For example, if TCE (trichloroethylene) is found to have contaminated a well, then its source, whether it be an activity or condition, must be identified.

Identifying the location of potential Threats relies on field surveys and existing databases of land use activities. According to the Technical Rules, determining whether the activity is a significant risk occurs by multiplying the Intrinsic Vulnerability of an area by the level of Threat (this is determined by relating the type of Activity and specific circumstances to a series of tables provided by the Ministry of the Environment (MOE 2008b)) For example, within 100 meters of a wellhead the Intrinsic Score is ten (10). A private septic system scores a 10 according to the MOE tables. Therefore, a septic system in this 100 m zone will score a 100 (10x10). Anything scoring over 80 is considered a Significant Threat so in this instance the Activity (septic) is a Significant Threat.

1.2.3 The Third and Fourth Stages

Following completion of the Assessment Report, the third stage of the process required the preparation of a Source Protection Plan for each Source Protection Area. Source Protection Plans are intended primarily to prevent new risks to drinking water from being established and to reduce those risks already on the landscape to an acceptable level. In the SGBLS region, a planning work group was established in July 2009 to provide policy expertise and advice to the Source Protection Committee (SPC) during preparation of the Source Protection Plan. The Source Protection Plan took effect on July 1, 2015.

The final (fourth) stage of the process is implementation of the Source Protection Plan. This implementation includes municipal official plans and land use planning, provincial prescribed instruments, risk management officials and risk management plans, as well as education and outreach. Implementation is also subject to monitoring and reporting and will involve inspections and enforcement. Following approval and implementation of the plan, an iterative process of continuous improvement, review and updating will be ongoing.

1.3 The South Georgian Bay-Lake Simcoe Source Protection Region

The South Georgian Bay-Lake Simcoe Source Protection (SGBLS) Region is one of 19 Source Protection Regions across Ontario, established in accordance with the O'Connor recommendation to follow watershed boundaries (Figure 1-1; figures are located at the end of the chapter). The South Georgian Bay-Lake Simcoe Source Protection Region (SPR) is comprised of three Source Protection Areas: the Nottawasaga Valley Source Protection Area, the Severn Sound Source Protection Area, and the Lakes Simcoe and Couchiching-Black River Source

Protection Area (Figure 1-2). It should be noted that the Lakes Simcoe and Couchiching-Black River SPA is comprised of two watersheds (the Lake Simcoe watershed and the Black-Severn River watershed).

The SGBLS SPR spans over 10,000 km², from the Oak Ridges Moraine in the south to the Canadian Shield in the north. The region contains portions of the Niagara Escarpment, Oak Ridges Moraine, Oro Moraine, Peterborough Drumlin Fields, Simcoe Uplands and Lowlands and the Canadian Shield. The region includes fifty-two municipalities and three First Nations communities with 107 drinking water systems (109 including First Nations), 284 municipal wells, 16 municipal surface water intakes, and more than 50,000 private wells. The region is very complex and diverse in its geology, physiology, population, and development pressures, with a multiplicity of existing water uses including drinking water supply, recreation, irrigation, agriculture, commercial and industrial uses, as well as ecosystem needs.

Four Source Protection Regions share a border with the SGBLS Region, these being the TCC (Trent Conservation Coalition), CTC (Credit Valley, Toronto and Region, and Central Lake Ontario), Lake Erie, and the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Regions (Figure 1-1). As drinking water systems and associated Vulnerable Areas may span Source Protection Region boundaries, the Terms of Reference listed all those matters in one Region that may affect another. This process sets the stage for collaboration between Source Protection staff and committees, ensuring where cross-boundary situations occur, the required information is included in the Assessment Reports and Source Protection Plans.

1.4 Participants in The Process

The process of completing each Assessment Report has been complex, requiring involvement and commitment from a diverse number of individuals and various oversight committees including the Source Protection Committee, municipalities, Provincial Ministries, consulting companies, and Source Protection Authorities. Here we outline some of the main participants in the process.

1.4.1 Source Protection Authorities (SPA)

In accordance with the *Clean Water Act*, Conservation Authority Boards of Directors serve as the SPA where they exist. Where Conservation Authorities do not exist (as in the case of the Black-Severn River and Severn Sound watersheds), an existing watershed agency, the municipality, or a newly formed group serves as the SPA. In the SGBLS SPR, the Nottawasaga Valley SPA is the Nottawasaga Valley Conservation Authority and the Severn Sound SPA is represented by the Severn Sound Environmental Association. For the Lakes Simcoe and

Couchiching-Black River SPA, representation is a combination of the Lake Simcoe Region Conservation Authority and municipal representatives from the Black-Severn River watershed.

Source Protection Authorities are responsible for a range of tasks including: establishing the SPC, providing the SPC-approved Terms of References, Assessment Report and Source Protection Plan to the Province, and overseeing operational aspects such as budgeting, staffing and reporting requirements. As the lead agency, the Lake Simcoe Region Conservation Authority manages the administrative and financial aspects of the program and oversees the work of the Source Water Protection (SWP) project team with input from the other SPAs.

1.4.2 Source Protection Committee (SPC)

As required by the CWA, a Source Protection Committee (SPC) for the South Georgian Bay-Lake Simcoe Source Protection Region was established in December 2007. The primary purpose of the SPC is 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 Committee developed a Source Protection Plan that include policies and strategies to protect our drinking water by preventing, reducing or eliminating significant threats to those water resources. In the development of the Source Protection Plan, the Committee was required to:

- Ensure that public concerns are heard and taken into consideration
- Consult with impacted landowners
- Establish policies based on the best available science and be mindful of the precautionary principle
- Consider all economic impacts
- Make decisions that are fair and reasonable through an open and transparent process

Ultimately the SPC is responsible for overseeing the development of the three key pieces of documentation outlined above (the Terms of References, Assessment Reports and Source Protection Plans).

The SPC members represent a wide range of interests including municipal, economic, First Nations and the general public. Protection Committee members also participated in working groups established to address specific aspects of the process. These working groups make recommendations to the SPC regarding the Assessment Report and Source Protection Plan development. Critical to the completion of the Assessment Report was the Technical Work Group. The Technical Work Group reviewed all of the technical studies undertaken for the Assessment Report. Information was only included in the Assessment Report if all their concerns (if any) had been addressed and subsequently endorsed by the entire SPC. Committee

members also raised items that did not fall within the Assessment Report framework – see Chapter 18 for more details.

1.4.3 Municipalities

There are fifty-two municipalities within the SGBLS Region including upper tier, lower tier and single tier municipalities. All municipalities and the Source Protection Areas they are within are presented in Table 1-1.

Municipal involvement in the preparation of the Assessment Report has occurred in many capacities including membership on the SPC and SPA. While all municipalities have played an important role in development of the Assessment Report, many were task leads for the technical studies undertaken for drinking water systems in their municipality. Municipalities also played a critical role in reviewing technical studies and in the confirmation of any Significant Threats to a drinking water system. Municipalities are also important partners in the implementation of the Source Protection Plan.

The municipal Task Leads within the Nottawasaga Valley Source Protection Area are:

- The City of Barrie
- The Regional Municipality of Peel (Town of Caledon)
- The Town of Mono (Dufferin County)
- The Town of Shelburne (Dufferin County)
- The Township of Mulmur (Dufferin County)
- The Town of Wasaga Beach (Simcoe County)
- The Township of Adjala-Tosorontio (Simcoe County)
- The Township of Essa (Simcoe County)

Table 1-1: Municipalities within the South Georgian Bay-Lake Simcoe Source Protection Region and the Source Protection Areas they are within

Municipality	Lake Simcoe and Couchiching-Black River	Lake Simcoe and Couchiching-Black River	Nottawasaga	Severn Sound
Dufferin (County of)			Yes	
Durham (Regional Municipality of)	Yes			
Grey (County of)			Yes	
Haliburton (County of)		Yes		
Muskoka (District of)		Yes		Yes
Peel (Regional Municipality of)	Yes		Yes	
Simcoe (County of)	Yes	Yes	Yes	Yes
York (Regional Municipality of)	Yes		Yes	
Adjala-Tosorontio (Township of)			Yes	
Algonquin Highlands (Township of)		Yes		
Amaranth (Township of)			Yes	
Aurora (Town of)	Yes			
Barrie (City of)	Yes		Yes	

Municipality	Lake Simcoe and Couchiching-Black River	Lake Simcoe and Couchiching-Black River	Nottawasaga	Severn Sound
Blue Mountains (Town of)			Yes	
Bracebridge (Town of)		Yes		
Bradford West Gwillimbury (Town of)	Yes		Yes	
Brock (Township of)	Yes			
Caledon (Town of)	Yes		Yes	
Clearview Township			Yes	
Collingwood (Town of)			Yes	
Dysart et Al (Municipality of)		Yes		
East Gwillimbury (Town of)	Yes			
Essa (Township of)			Yes	
Georgian Bay (Township of)		Yes		Yes
Georgina (Town of)	Yes			
Gravenhurst (Town of)		Yes		
Grey Highlands (Municipality of)			Yes	
Innisfil (Town of)	Yes		Yes	

Municipality	Lake Simcoe and Couchiching-Black River	Lake Simcoe and Couchiching-Black River	Nottawasaga	Severn Sound
Kawartha Lakes (City of)	Yes	Yes		
King (Township of)	Yes		Yes	
Lake of Bays (Township of)		Yes		
Melancthon (Township of)			Yes	
Midland (Town of)				Yes
Minden Hills (Township of)		Yes		
Mono (Township of)			Yes	
Mulmur (Township of)			Yes	
Muskoka Lakes (Township of)		Yes		
New Tecumseth (Township of)	Yes		Yes	
Newmarket (Town of)	Yes			
Orillia (City of)	Yes	Yes		Yes
Oro-Medonte (Township of)	Yes		Yes	Yes
Penetanguishene (Town of)				Yes
Ramara (Township of)	Yes	Yes		
Scugog (Township of)	Yes			

Municipality	Lake Simcoe and Couchiching-Black River	Lake Simcoe and Couchiching-Black River	Nottawasaga	Severn Sound
Severn (Township of)		Yes		Yes
Shelburne Township (Town of)			Yes	
Springwater (Township of)	Yes		Yes	Yes
Tay (Township of)				Yes
Tiny (Township of)				Yes
Uxbridge (Township of)	Yes			
Wasaga Beach (Town of)			Yes	
Whitchurch-Stouffville (Town of)	Yes			

Note for the table above:

1. The highlighted column indicates the municipalities that are within this Assessment Report

1.4.4 First Nations

There are three First Nation Communities in the SGBLS region: the Chippewas of Georgina Island, the Chippewas of Christian Island and the Chippewas of Rama First Nation. Participation in the program is voluntary for First Nation communities, and the Chippewas of Rama First Nation have chosen to send a representative to the SPC and undertake some technical investigations.

1.4.5 Consultants

Technical studies undertaken to complete this report were largely completed by consulting firms. Use of consultants was necessary considering the large number of individual studies that needed to be undertaken and the different skill sets required (e.g. hydrologist, hydrogeologists, modelers, GIS technicians etc.). Consulting firms were either contracted by the Source Protection Authorities or by member municipalities who took responsibility for projects conducted in their jurisdiction. The following consulting firms prepared information for the SGBLS Assessment Reports:

- Genivar (formerly Jagger Hims Limited)
- Golder Associates Ltd.
- W.F Baird & Associates Coastal Engineers Ltd.
- R.J. Burnside and Associates Limited
- Jacques Whitford Stantec Limited
- Aecom
- Earthfx Incorporated
- SNC-Lavalin Inc.
- Dillon Consulting Limited
- Azimuth Environmental Consulting Inc.
- AquaResource Inc.
- J.D. Barnes Limited
- Acres International Limited
- Clarifica Inc.
- Gerber Geosciences Inc.
- Stantec
- WSP Golder
- WSP
- Aqua Insight

1.4.6 Peer Reviewers

All technical studies completed for the Assessment Report were reviewed to help ensure the data, methods and assumptions applied were of sufficient standard for the Source Water Protection process. In addition, these reviews were undertaken to facilitate consistency between the technical studies and to ensure the content and methods complied with the Technical Rules (MOE, 2008a). Varying levels of review were provided by municipal representatives, MNR (now the Ministry of Natural Resources and Forestry (MNRF)) and MOE

representatives, consultants, members of the Source Protection Committee, SWP and SPA staff, and Conservation Ontario staff. These reviewers had a broad range of knowledge bases and include, but are not restricted to, the following professionals: hydrologists, modelers, hydrogeologists, environmental scientists, civil engineers and public health officials. While the water budget exercise required a third-party peer review exercise, the remaining technical studies were subjected to varying levels of scrutiny. All technical studies, however, were reviewed by Source Water Protection (SWP) technical staff. Further information about the peer reviews is provided throughout the Assessment Reports, with peer review comments provided in the Appendices.

1.4.7 Public

The public has participated in the Source Protection Process by providing Source Protection Committee and Staff members updated information about what types of activities are occurring on their properties. The information gathered from the Assessment Report Open Houses hosted by the South Georgian Bay-Lake Simcoe Source Protection Committee as well as calls and e-mails to the South Georgian Bay-Lake Simcoe Source Protection Staff has been used to update this report.

1.5 Purpose and Scope of This Report

The Assessment Reports were the basis for the next stage of the Source Protection process – developing Source Protection Plan and making local policy decisions for protecting the quality and quantity of drinking water. Although the primary purpose of the Assessment Report is to provide the SPC with the information needed to develop Source Protection Plan, it is recognized that the information it contains is of use and interest to a much broader audience including the general public and municipalities. This is especially true in relation to identifying land uses and activities that are potential Significant Threats to drinking water quality and quantity.

The content and scope of the Assessment Report is dictated by the *Clean Water Act* and associated regulations which specify the minimum information that must be included. To facilitate preparation of the Assessment Report, a set of Technical Rules (MOE, 2008a) were provided by the Province that specifies what information must be included and how certain information must be determined. Generally speaking, the Technical Rules require the following information to be included in each Assessment Report:

- **Characterization of the Source Water Protection Area watershed:** this includes descriptions of the natural and human geography

- **A Conceptual water budget for the entire SWP area and a Tier 1 water budget for each subwatershed:** those systems identified as having water quantity stress in the Tier 1 water budget, progress to a more detailed Tier 2 water budget and Tier 3 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 potentially Significant Threats to the water quality are identified

The *Clean Water Act* requires the inclusion of Municipal Residential Drinking Water Systems in the Source Protection Planning process. The *Clean Water Act* also allows for a variety of systems that are not Municipal Residential Systems to be included either by the choice of the Municipal or First Nations councils. Systems can be excluded from the process if they are due to be decommissioned within a reasonable time frame. In the SGBLS region, and as described in the Terms of Reference (ToR) for each Source Protection Area, there are a total of 289 supply wells and 16 surface water intakes. These systems supply water to approximately 75% of the population in the Region. As highlighted in Table 1-2, within the Nottawasaga Valley Source Protection Area there are 110 municipal supply wells included in the Terms of Reference and 1 surface water intake providing water for 34 drinking water systems. As there are many drinking water systems in the Region, the majority of each Assessment Report is dedicated to reporting the Vulnerability and Threats of the drinking water systems.

Table 1-2: Number of Drinking Water Systems, Municipal Supply Wells and Municipal Surface Water Intakes in the South Georgian Bay-Lake Simcoe Source Protection Region

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	30	79	7
Lake Simcoe			
Lake Simcoe and Lake Couchiching – Black River	10	10	6
Black-Severn			
Nottawasaga	34	110	1
Severn Sound	36	90	2
Total	110* (108)	289	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

1.6 How This Report Is Organized

This report represents one Assessment Report out of three required for the SGBLS Region. The Three Assessment Reports required are:

1. Lakes Simcoe and Couchiching–Black River Source Protection Area Assessment Report . Note that as the Source Protection Area covered by the Lakes Simcoe and Couchiching–Black River Assessment Report includes two separate and very different watersheds - Lake Simcoe and Black Severn River – the report has been separated into two parts, each part representing one of the two watersheds:
 - Part 1: Lake Simcoe Watershed and
 - Part 2: Black-Severn River Watershed (Couchiching-Black River)
2. Nottawasaga Source Protection Area Assessment Report (this report)

3. Severn Sound Source Protection Area Assessment Report

This report has been organized to maximize usability to the reader. Broadly speaking, information in this report falls into one of two categories:

1. Information related to the entire Source Protection Area
2. Information related to Vulnerability, Threats and Issues of municipal drinking water systems. A flow chart that summarizes the main topics, chapters and related municipalities is presented in Figure 1-3

Chapters 2-4 provide information related to the entire Source Protection Area and include watershed characterization (Chapter 2), water budget (Chapter 3), and regional scale Vulnerable Areas - Highly Vulnerable Aquifers (HVAs) and Significant Groundwater Recharge Areas (SGRAs) - (Chapter 4).

The water budget chapter is further divided into four sections, these being: conceptual water budget, Tier 1, Tier 2 and Tier 3 water budgets. Conceptual and Tier 1 water budgets are completed for each subwatershed in the area, whereas Tier 2 water budgets are only required for those watersheds that have been identified as being stressed in the Tier 1 water budgets. Tier 3 water budgets are required for each drinking water system within a subwatershed which has been found to have a significant or moderate stress as a result of the Tier 2 water budget. Tier 3 water budgets have not yet been completed and will therefore be incorporated into future updated Assessment Reports.

Chapter 5 provides an overview of the methods and technical rules related to assessing Vulnerability and Threats of drinking water systems. It is intended to be an introduction to the more detailed information in the following chapters and provides a summary of the Technical Rules requirements.

The next 12 chapters in the report are dedicated to a detailed assessment of the Vulnerability, Issues and Threats of specific municipal drinking water systems. For ease of use, a chapter has been dedicated to each municipality responsible for the drinking water supply. Each municipal vulnerability and threats chapter includes the same overall information, specific to each drinking water system, that being:

1. Delineation of either the Well Head Protection Area (WHPA) for supplies using groundwater, or Intake Protection Zones (IPZ) for surface water systems
2. An assessment of WHPA or IPZ vulnerability to Drinking Water Threats
3. An evaluation of any Drinking Water Issues (essentially determining if the water supply is contaminated in a manner that is, or tending to be, a risk to drinking water supply)
4. Threats assessment, whereby:

- areas that are or would be Significant, Moderate or Low risk are identified depending on the type of parameter and the vulnerability
- the number of locations that a significant threat occurs within the vulnerable areas is enumerated. In accordance with the Technical Rules each chapter contains a written description of how the work was undertaken, including data and information sources, methods and limitations

The final chapter aims to put the findings of the report into context of other issues such as climate change and the Great Lakes Agreement. This chapter also includes items SPC members raised that did not fall within the Assessment Report framework.

In addition to the main Assessment Report, there are also numerous appendices. The appendices contain memorandums, reports, tables and figures that support information contained within the Assessment Reports. The preamble to this report highlights all the appendices provided.

1.7 Information Gaps and Continuous Improvement

The content of this Assessment Report is based on the best available information and has been prepared to meet all the requirements of the *Clean Water Act* and Technical Rules (MOE, 2008a). There are cases, however, where required information is either not provided (a gap) or the information provided is not based on the most recent data. These situations have arisen either because the information arrived too late in the reports' preparation process, or the information was not available (i.e., it either does not exist or is still being completed). In these situations, the report provides an explanation as to why the problem exists, and at what point after submission of the Assessment Report new or updated information will be incorporated.

The *Clean Water Act* includes provision for updating the Assessment Reports:

If, after the Director approves an assessment report and before a proposed source protection plan is submitted to the source protection authority under subsection 22 (16), the source protection committee becomes aware that the assessment report is no longer accurate or complete, the source protection committee shall submit an updated assessment report to the source protection authority (2006, c. 22, s.19 (1)).

In accordance with the Act, the SGBLS SPC will continue to fill gaps, incorporate new data and refine the assessment report technical work after the required submission date, but before the proposed Source Protection Plans have been submitted. Opportunities for input and review of amended Assessment Reports will be made available to those affected by the proposed changes.

Figure 1-1: Source Water Protection Areas and Region

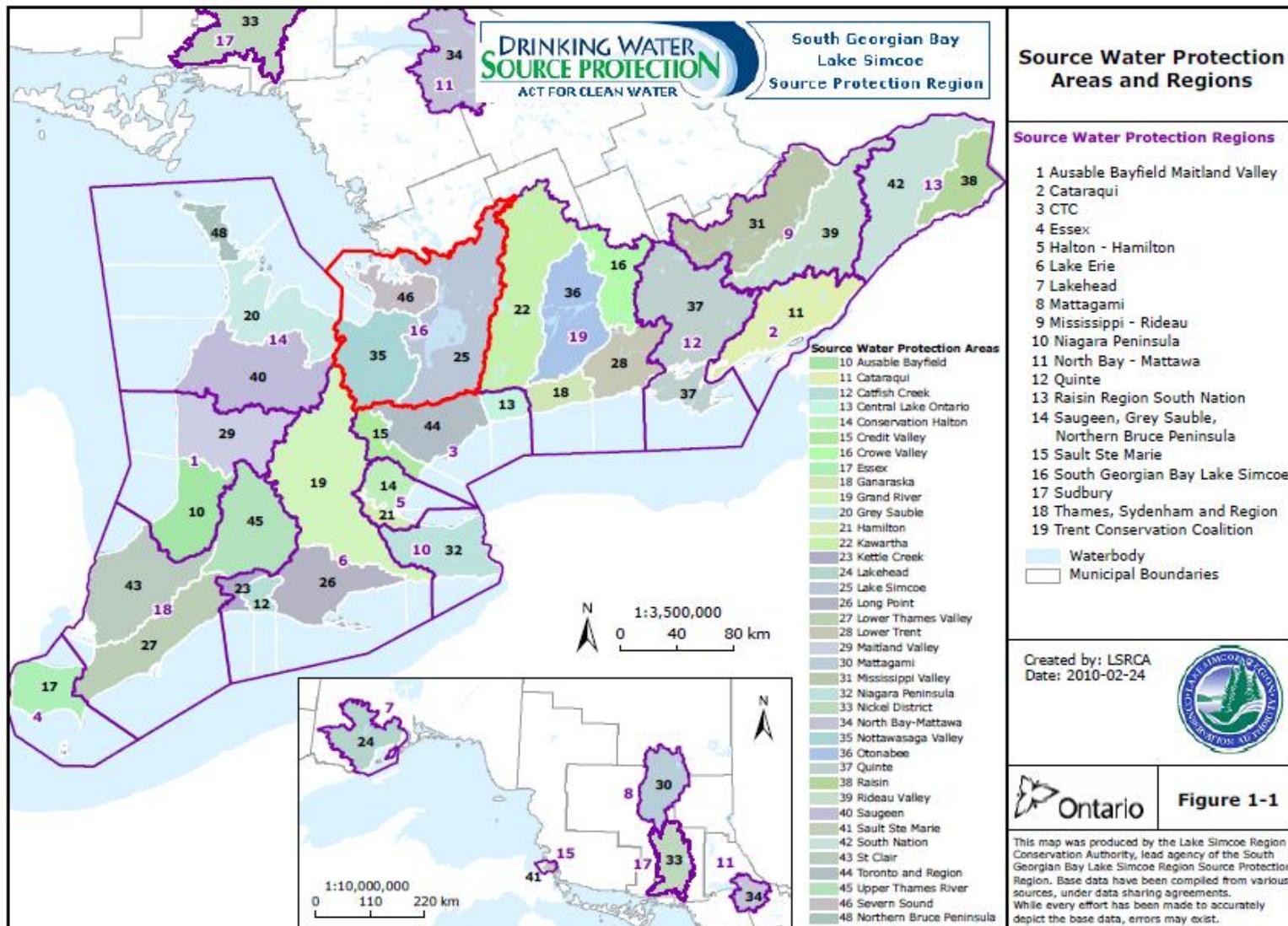


Figure 1-2: Source Water Protection Areas and Municipalities

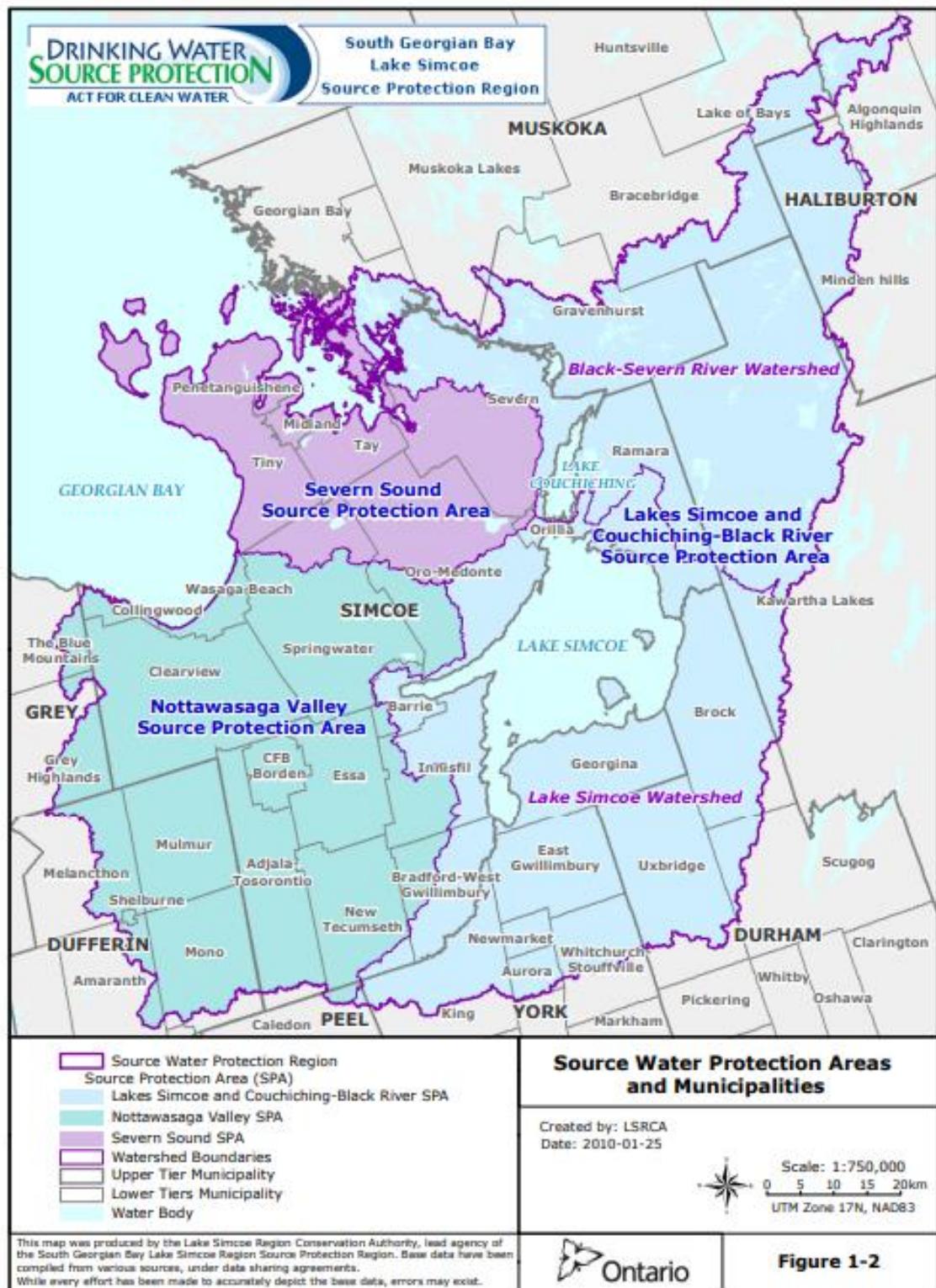


Figure 1-3: Summary of the organization of the Nottawasaga Valley Assessment Report

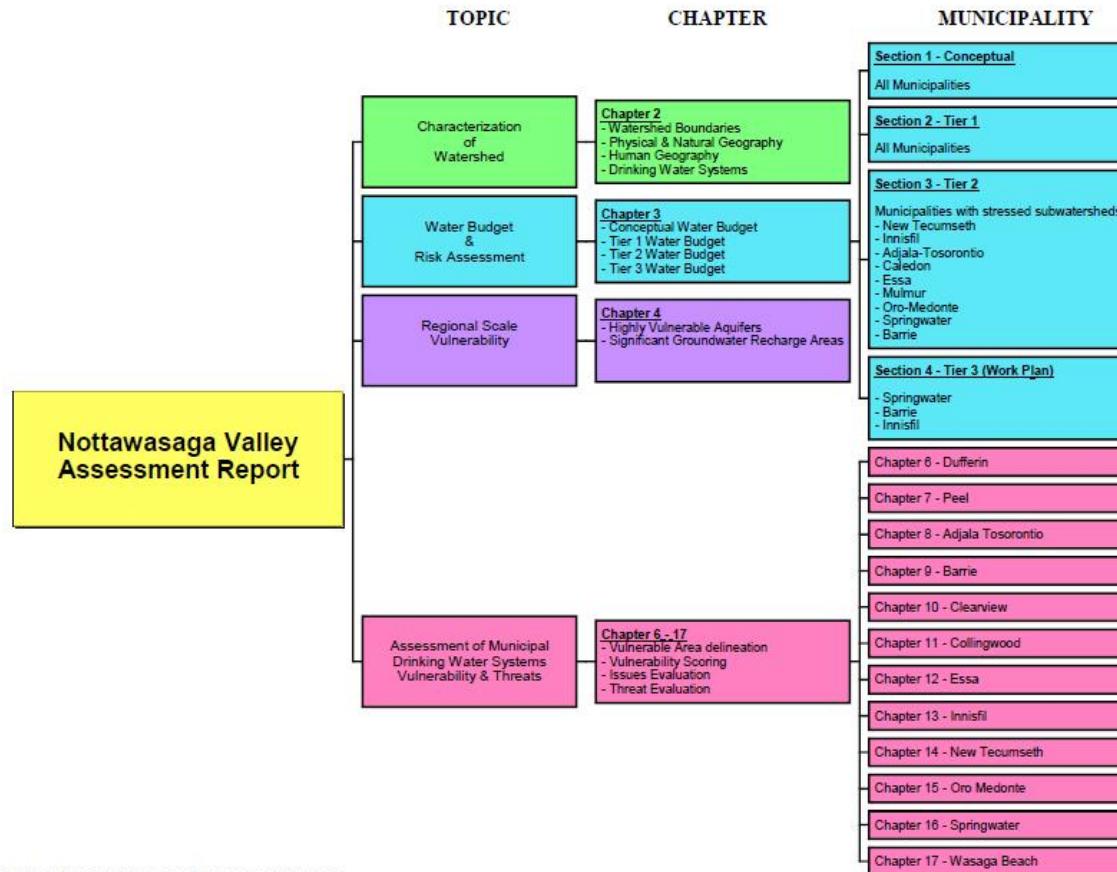


Figure 1-3 Summary of the organization of the Nottawasaga Valley Assessment Report