Thames – Sydenham and Region Source Protection Committee

Meeting Notice

Please be advised that a meeting of the Thames-Sydenham and Region Source Protection Committee has been called for the following time. Please confirm attendance with Deb Kirk by email at kirkd@thamesriver.on.ca

Meeting Date: March 25, 2022

Meeting Time: 10:00 am 1:00 p.m.

Meeting Location: **Zoom Virtual Meeting - Meeting ID:** Join Zoom Meeting
Meeting ID: 895 7937 5671
Passcode: 292826

Proposed Agenda

1	**Chair's Welcome, Roll Call and Certification of Quorum**	10:00-10:15
2	**Adoption of the Agenda**	
3	**Approval of November 5, 2021 SPC minutes**	
4	**Delegations** *(none scheduled)*	
5	**Declaration of Conflict of Interest**	
6	**Business arising from the minutes**	
7	**Business**	
7a	TSR 2021 Annual Progress Report 7a (i) Staff Report 7a (ii) TSR 2021 Annual Progress Report 7a (iii) TSR 2021 Implementation Status Summary 7a (iv) TSR 2021 Supplemental Form	10:15-11:00
7b	Section 36 Early Engagement Report	11:00-11:10
7c	Approved 2001 Director's Technical Rules- *Motion required* 7c(i) Staff report 7c(ii) Local Implementation Report 7c(iii) Priority Presentation (presentation)	11:10-11:40
8	**Information-** 8i. Best Management Practices for Source Water 8ii. Bulletin: 2001 Director's Technical Rules Guidance 8iii. Bulletin: Climate Change Consideration 8iv. Article: Salt contamination of Lake Simcoe a frightening warning about highway expansion 8v.Article: 'Lethal levels of salt' seen in some southern Ontario waterways, warns WWF Canada 8vi. Article: Local wastewater surveillance project 8vii. Article: Oneida Nation on verge of joining Lake Huron water supply system	11:40-11:45

	8viii. World Water Day: Link: https://www.worldwaterday.org/	
9	**In Camera Session** (not planned)	
10	**Other Business**	
11	**MECP Liaison report**	11:45-12:15
12	**Members Reports**	12:15-12:30
13	**Adjournment & Next Meeting**	12:30

SPC MEETING MINUTES
NOVEMBER 5, 2021
Meeting #78

The Source Protection Committee Chair, Dean Edwardson called the meeting to order at 10:00 a.m. on November 5, 2021 via ZOOM. The following members and staff were in attendance;

Members

Dean Edwardson
Johnny Bowes
Jarrod Craven
Gary Eagleson
Vince Gagner
Carl Kennes
Earl Morwood
Christa Sawyer
Karleen Sirna
Matthew Jauernig
John Van Dorp
Darlene Whitecalf
Joe Salter (Liaison)
Olga Yudina, MECP

Regrets:

Brent Clutterbuck
Pat Feryn
Andrew Powell (HU Liaison)
George Marr
Gary Martin

Staff:

Jenna Allain
Deb Kirk
Steve Clark
Katie Ebel
Julie Welker
Emily De Cloet
Ken Phillips

Deborah Balika,
Source Protection Lead, Conservation Ontario

1) Chair's Welcome

Dean Edwardson welcomed the committee. After the roll call, he acknowledged a quorum was achieved. The members and staff introduced themselves to include the newest members. Julie Welker was introduced as the new Source Program Coordinator with Jenna Allain moving into a new role of Manager of Planning with the UTRCA. Dean advised everyone of Darlene Whitecalf, a long standing committee member's passing in July; and noted she will be very much missed.

2) Adoption of the Agenda

The November 5, 2021 agenda be approved.

Moved by Carl Kennes-seconded by Earl Morwood

"RESOLVED that the November 5, 2021 agenda were approved."

CARRIED.

3) Approval of March 26, 2021 SPC minutes

The March 26, 2021 previous meeting minutes be approved.

Moved by John Van Dorp-seconded by Valerie M'Garry

"RESOLVED that the March 26, 2021meeting minutes were approved."

CARRIED.

4) Delegations

None.

5) Declaration of Conflict of Interest

No conflict of interest was identified.

6) Business Arising from the minutes

None.

7) Business

a) Chairs Meeting /Update

Dean Edwardson gave an update from the SPC Chairs meeting held on September 14, 2021. The presentations from that meeting were included in the package under Agenda Item #8. Phosphorus and Algal Blooms and Overview of Per-and Polyfluoroalkyl Substances. The Chairs will be meeting again in the near future and Dean will be discussing this region's local concerns such as geothermal, wind turbines, salt piles, and ASM piles.

b) Stantec Presentation

Kelly McLagan from Stantec gave a presentation titled: *Hydrogeological Assessment and Source Protection Updates within the Waterloo Moraine Strasburg/Parkway Well Fields Case Study.* The study site was in the Region of Waterloo with a population of 550,000 and 75% of water supply is groundwater, having approximately 100 municipal wells, 40 plus well fields. The Strasburg Parkway Well Fields was the area of focus located in south Kitchener.

The study's goal was to understand how to maintain long term groundwater quality and quantity; looking at various land uses in the area; residential, industrial/commercial and City's snow facility, nearby development and proposed development and how these affect water quality/quantity (Groundwater / Surface Water Interactions). Tier 3 modelling and pumping rates were looked at. Transport Pathway Adjustments and Vulnerability Scoring was done and calculation of Percentage of Managed Lands and Livestock Density and Surrogate Percent Impervious Areas.

Using the list of Prescribed Drinking water threats, Stantec updated the previous threat inventory to reflect the following:

- Updated WHPAs
- Changes to land use, identified through a detailed field survey
- Review of aerial imagery

- Mapping of sanitary/sewer pipes
- Updated road networks
- Stormwater management pond locations

This region worked with other stakeholders to obtain thorough dataset for model updates. When data gaps existed, a field program was completed to supplement existing understanding Tier 3 model has been maintained and updated to remain useful and relevant for planning and development decisions Region uses Tier 3 model to evaluate land use activity and future planning decisions on an on-going basis.

A question was asked concerning a former landfill site in Kitchener and the uncertainly about what was deposited there was asked. This was not included in the study however the City is looking into this.

c) Section 48 Presentation

Julie Welker gave a presentation on the new regulation under the Safe Drinking Water Act that took effect July 1, 2018. This regulation applies in Source Protection Areas identified under the Clean Water Act. This was presented and discussed at March 23rd, 2018 SPC meeting.

The intent of the regulation is to ensure sources of drinking water for new or expanding drinking water systems are protected before providing water to the public. Municipalities (or system owners) are required to ensure work necessary under the Clean Water Act to delineate and score vulnerable areas is completed before they can apply for a drinking water works permit. It will be important to engage SPAs early.

The New Regulation applies where:
• A new municipal residential drinking water system is being located within a source protection area, or
• Changes are being made to an existing municipal residential drinking water system located in a source protection are that results in:

- the establishment of a new groundwater well
- deepening an existing well
- increasing the capacity at an existing well
- the establishment of a new surface water intake
- moving an existing intake

Section 48 of O.Reg. 287/07 under the CWA was amended to include the requirements for the 'notice' referred to in the new Safe Drinking Water Act Regulation. The owner of the drinking water system notifies SPA of their intention to make an application for a drinking water works permit and requests SPA to provide written confirmation that the mapping/scoring of vulnerable areas is complete.

The Notice from the SPA will:
- Include a statement that they are satisfied with the vulnerable area work;
- Identify the amendments required to the plan as a result;
- Indicate when the SPA will be proposing amendments;
- Identify whether the amendments have already been made.

Since this new regulation came into effect, UT SPA has written two notices, one in Thamesford and one for Ridgetown.

d) SP Road Signs, Song, Webinar Series-Julie Welker

A music video and an online mapping application are available from Conservation Ontario to help educate the public about drinking water protection zone signs. The mapping highlights areas where extra protective measures help to reduce risk and keep drinking water safe and clean. The new campaign aims to resolve some of the confusion motorists may feel as they see some of the 1,700 signs along the province's highways and local roads. A road sign and other SP videos will be created for our region in the spring.

The link to the song can be found at https://youtu.be/ltN2JWovQIw

Conservation Ontario has planned interactive webinar series featuring OBWB's newly published Source Water Protection Toolkit. The webinars will run every Wednesday, October 20 to December 15, 2021from 11 am to 12 pm. This resource was specially designed to support water utilities, local and provincial government staff, elected officials, First Nations, conservation groups and water professionals who are interested in or responsible for protection of drinking water sources in B.C. and beyond.

8) Information

The items listed below were provided to the committee as a FYI:

8i.) Article: Ancient groundwater Why the water you're drinking may be thousands of years old

8.ii.) Article: Wheatley explosion

8.iii.) Article: Nunavut government to fly 80,000 litres of water to Iqualuit to address citywide crisis

8.iv) Presentation slides: Phosphorus & Algal Blooms

8.v Presentation slides: Overview of Per-and Polyfluoroalky Substances

Other areas of concern noted by members:

Fire Extinguishers: A fire at a Flea Market in Smith Falls in 2016 resulted in an investigation by the Ministry due to the fire extinguisher foam which contaminated 12 wells and the water is still not drinkable. Work is being done to change to a more environmentally friendly product that does not contaminate.

Glitter bath balms that contain "*synthetic mica"* were questioned as they are not water soluble as originally thought and need to also be considered as they get into water supplies.

9) In Camera Session

None.

10) Other Business

None.

11) MOECP Liaison Report

Olga Yudina, the MECP Liaison provided an update. She noted changes in leadership roles in the MECP since the previous meeting with Kirstin Corrigal now the Manager of SP Branch, she was the former Manager of the Species at Risk program. The recent government cabinet shuffle resulted in a new Minister, David Piccini, who they are assisting in getting up to speed on all the program files.

The SP branch is working on finalizing the Amendments to the Director's Technical Rules. These rules will offer technical methodology to assess vulnerability/ risk under the Clean Water Act. The goal will be to incorporate any new science, identify and address gaps and implementation challenges since the development of the Source Protection Plan and Assessment Reports. It has been an extensive process involving a lot of research and analysis in consultation with SPC Chairs, Project Managers, and municipalities and was posted on EBR and was re-assessed after review of comments.

The *Best Management Practices for Source Protection -Guidance Document* is being finalized and will be used to ensure the communities/individual have the tools to also protect non-municipal, residential drinking water sources, private wells. The guidance document is based on all the information we have learned and will provide tips on how to protect sources of water. When completed the document will be released on the website Ontario.ca

12) Members Report

Vince Gagner: The Sarnia-Lambton Environmental Association (SLEA) has been invited by various groups to present at their Virtual Drinking Water Program with a focus on Sarnia-Lambton industry efforts to prevent spills to the St. Clair River as well as updates to the regional spill notification system. Vince reported there is a new spills response protocol for the Sarnia area to include a Code 10; which consists of an automated notification to all member companies of a spill.

13) Adjournment

There being no further business, the meeting was adjourned **at 11:40 a.m.**.

Moved by John Van Dorp-seconded by Valerie M'Garry

"RESOLVED that the meeting be adjourned."

CARRIED.

PLEASE NOTE: Next SPC meeting to be determined

Thames – Sydenham and Region Drinking Water Source Protection
Source Protection Committee Discussion Paper

Report to	Chair and members Thames – Sydenham and Region Source Protection Committee	**Agenda #**	7a.i 2022.03.25
Cc	SP Management Committee	**Date**	March 25, 2022
Prepared By	Julie Welker, Source Protection Coordinator		
Re:	Thames-Sydenham and Region 2021 Annual Report		

Purpose

To review the contents of the Thames-Sydenham and Region 2021 Annual Progress Report and provide written comments to the Source Protection Authorities about the extent to which, in the opinion of the Committee, the objectives set out in the source protection plan are being achieved by the measures described in the report.

Background

Staff analysed reports received on source protection plan policy implementation progress from implementing bodies. The 2021 Annual Progress Report is prepared accordingly, for review by the Thames-Sydenham and Region Source Protection Committee (TSR SPC) and Source Protection Authority Boards prior to submission to the Ministry of the Environment, Conservation and Parks (MECP).

Report

As required by the Clean Water Act, the TSR Source Protection Region must prepare an annual progress report to demonstrate progress made in implementing policies that protect surface water and groundwater municipal drinking water sources in the region. **Figure 1** provides a simplified overview of the comprehensive process.

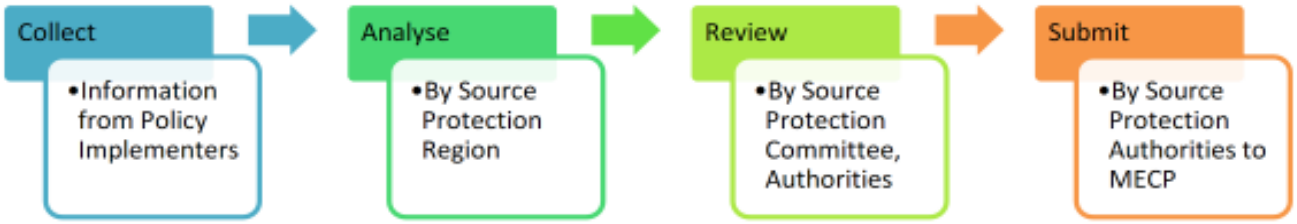


Figure 1: Source Protection Plan - Annual Progress Reporting at a Glance

Staff analysed information from implementing bodies, using the online Electronic Annual Reporting (EAR) tool. Municipalities, provincial ministries and Risk Management Officials are commended for their large effort in collecting pertinent data and information over the course of the year, to inform the annual progress reporting process to multiple source protection authorities overlapping political boundaries.

Reporting information is provided to MECP at the source protection region level, based on TSR SPR's analysis of hundreds of contributing data and information from policy implementers provided by February 1 every year. In turn, the MECP collects the detailed synthesized reports from Source Protection Authorities across Ontario by May 1 every year, and aggregates it to the provincial scale in the annual Chief Drinking Water Inspector's Report.

Katie Ebel, Source Protection Policy and Risk Management Advisor at UTRCA, is acknowledged for her continued valuable data analytics work that helped organize and analyse large amounts of data and information.

Discussion

The theme, “achievement of source protection plan objectives” includes two report items that require Source Protection Committee (SPC) input: the first, the Committee’s opinion on the extent to which objectives in the plan have been achieved during the reporting period and the second, comments to explain how the committee arrived at its opinion. TSR staff have reviewed all of the information received from implementing bodies in preparation of the annual progress report and supplemental form and recommend the following responses:

Report Item ID: 350
In the opinion of the Source Protection Committee (SPC), to what extent have the objectives of the SPP been achieved in this reporting period?

Progressing well/on target – Majority of the source protection plan policies have been implemented and/or are progressing well.	✓
Satisfactory – Some of the source protection plan policies have been implemented and/or are progressing well.	
Limited progress made – A few of the source protection plan policies have been implemented and/or are progressing well.	

Report Item ID: 351
Please provide comments to explain how the SPC arrived at its opinion. Include a summary of any discussions that might have been had amongst the SPC members, especially where no consensus was reached.

December 31st, 2021 marked six years since our Source Protection Plan first took effect. In that time significant progress has been made to implement the policies contained in the plan, and address the activities that were identified as posing a risk to our municipal drinking water supplies. To date, 80% of the policies in the plan that address significant drinking water threats have been fully implemented, with the remaining 20% progressing well.

That being said, 2021 continued to be a difficult year for everyone due to the COVID-19 pandemic, and for those working in source protection, it was no exception. Risk Management Officials and Inspectors throughout the region put a pause on all site visits during lockdowns and resumed when those restrictions were lifted. Most Risk Management Officials and Inspectors have reported that it has been a challenging time to try and engage people to negotiate risk management plans, with many businesses just focused on saving or maintaining their operations as well as a number of businesses closing and new businesses opening. Risk Management Officials understood those challenges, and continued their efforts to ensure that municipal drinking water supplies were protected without creating undue hardships for businesses. An additional seven Risk Management Plans were established over the reporting period bringing the Region’s total Risk Management Plans to 65.

Approximately 53% of the 1058 originally identified significant drinking water threats have been successfully managed or eliminated. While there is still a considerable amount of work to do to address the remaining threats, the Thames-Sydenham and Region Source Protection Committee is pleased to see that policy implementation is moving steadily forward. For that reason, they believe that a ranking score of progressing well and on target is a fair assessment on our implementation progress.

Recommendation

That the Source Protection Committee approves the SPC comments on the annual report as drafted and direct staff to submit those comments to the Source Protection Authorities for inclusion in the Thames-Sydenham and Region Annual Progress Report submission.

DRINKING WATER
SOURCE PROTECTION
Our Actions Matter

Annual Progress Report

on Implementation of the Source Protection Plans for the Thames-Sydenham & Region Source Protection Areas

Reporting Period - January 1, 2021 to December 31, 2021

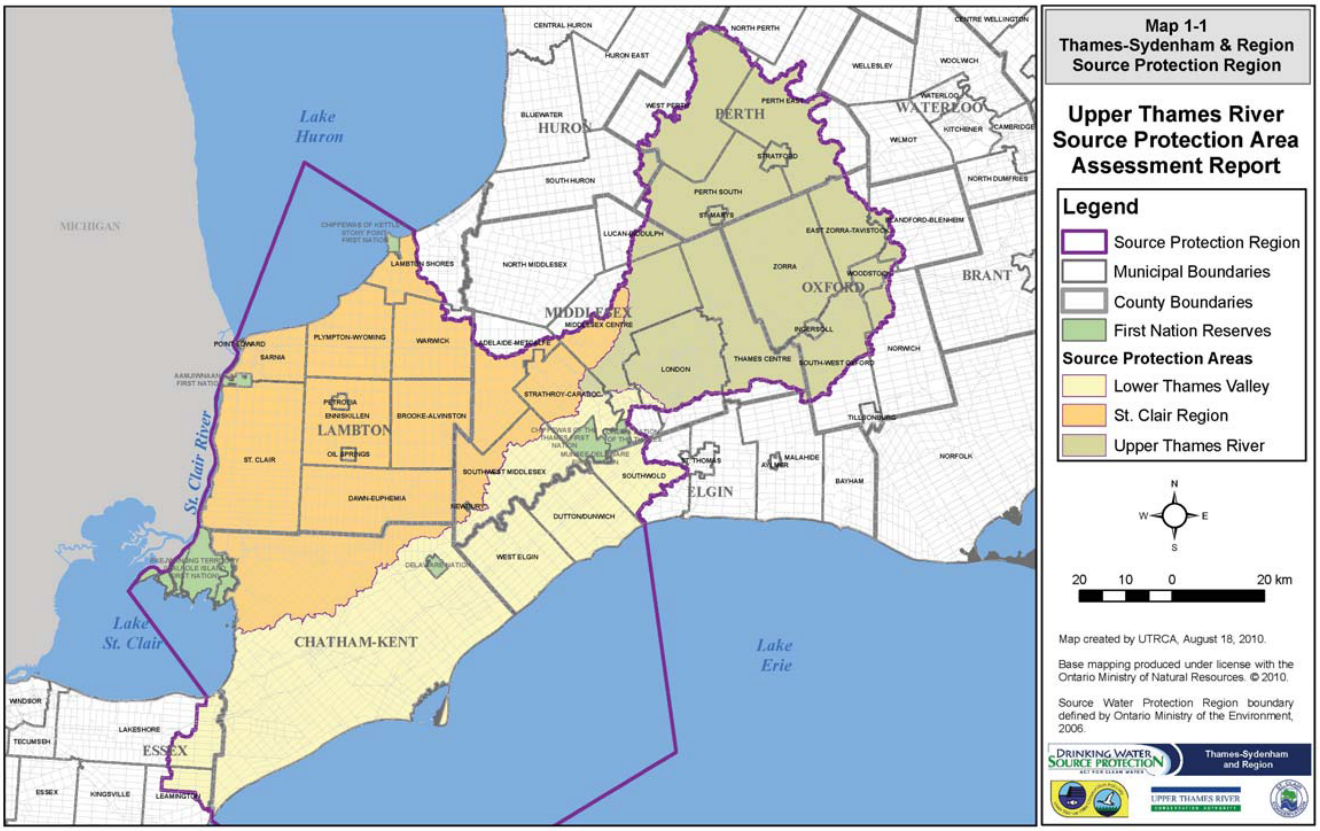
For more information about the drinking water source protection plan, visit
www.sourcewaterprotection.on.ca

Ontario

Source Protection Annual Progress Report

I. Introduction

This annual progress report outlines the progress made in implementing our source protection plan for the Lower Thames Valley Source Protection Area, St. Clair Region Source Protection Area and Upper Thames River Source Protection Area, as required by the Clean Water Act and regulations. This is the sixth Annual Progress Report released since the Source Protection Plan took effect on December 31st, 2015, and it highlights the actions taken from January 1 to December 31, 2021.



Disclaimer: an alternate format can be provided to the reader when requested.

II. A message from your local Source Protection Committee

P : Progressing Well/On Target – The majority of the source protection plan policies have been implemented and/or are progressing.

December 31st, 2021 marked six years since our Source Protection Plan first took effect. In that time significant progress has been made to implement the policies contained in the plan, and address the activities that were identified as posing a risk to our municipal drinking water supplies. To date, 80% of the policies in the plan that address significant drinking water threats have been fully implemented, with the remaining 20% progressing well.

That being said, 2021 continued to be a difficult year for everyone due to the COVID-19 pandemic, and for those working in source protection, it was no exception. Risk Management Officials and Inspectors throughout the region put a pause on all site visits during each lock down and resumed as lockdowns were lifted. Most Risk Management Officials and Inspectors have reported that it has been a challenging time to try and engage people to negotiate risk management plans, with many businesses just focused on saving or maintaining their operations and businesses closing and new ones starting up. Risk Management Officials understood those challenges, and continued their efforts to ensure that municipal drinking water supplies were protected without creating undue hardships for businesses. An additional seven Risk Management Plans were established over the reporting period bringing the Region's total Risk Management Plans to 65.

Approximately 53% of the 1058 originally identified significant drinking water threats have been successfully managed or eliminated. While there is still a considerable amount of work to do to address the remaining threats, the Thames-Sydenham and Region Source Protection Committee is pleased to see that policy implementation is moving steadily forward. For that reason, they believe that a ranking score of progressing well and on target is a fair assessment on our implementation progress.

III. Our Watershed

To learn more, please read our assessment report(s) and source protection plan(s)

The Thames-Sydenham and Region is made up of the watersheds of Lower Thames Valley, the St. Clair Region, and the Upper Thames River.

The Lower Thames Valley Source Protection Area includes those lands draining into the Thames River from the community of Delaware to Lake St. Clair. It also includes the lands that drain into Lake Erie lying south of the lower Thames River watershed and a small triangle of land north of the mouth of the Thames draining directly into Lake St. Clair. This area includes most of the municipality of Chatham-Kent, the western portion of Elgin County, part of southwestern Middlesex County (including some of the City of London) and a portion of eastern Essex County. The Lower Thames Valley Source Protection Area also includes four First Nation reserves; the Chippewas of the Thames First Nation, Deleware Nation, Munsee-Deleware Nation and Oneida Nation of the Thames. Caldwell First Nation is also established in the area between Leamington and Rondeau Bay; however they currently do not have a reserve. The area covers approximately 3,274 square kilometres with a total watershed population (2001) of about 107,000.

The residents of the Lower Thames Valley Source Protection Area receive most of their municipal drinking water from Lake Erie through 3 intakes. The communities of Ridgetown and Highgate receive their drinking water from municipal wells. Some parts of the watershed within Essex County receive their municipal drinking water from intakes in Lake St. Clair. Although the drinking water for much of the population of the Lower Thames is supplied from municipal drinking water sources, some residents rely on water from private wells.

The St. Clair Region Source Protection Area includes the Sydenham River drainage basin and several smaller watersheds that drain to Lake Huron, the St. Clair River or Lake St. Clair. The Source Protection Area covers over 4,100 square kilometres and includes most of the County of Lambton, part of the Municipality of Chatham-Kent and part of the County of Middlesex with a total watershed population of 167,000. The area also includes three First Nation reserves; Chippewas of Kettle and Stoney Point, Aamjiwnaang, and Walpole Island First Nations.
The residents of the St. Clair Region Source Protection Area receive most of their municipal drinking water from Lake Huron and the St. Clair River through 3 intakes. Parts of Middlesex County receive their municipally supplied drinking water from an intake in Lake Huron outside the Source Protection Region. There are no longer any communities in the St. Clair Region that receive drinking water from municipal wells. Although the drinking water for much of the population of the Lower Thames is supplied from municipal drinking water sources, some residents rely on water from private wells.

The Upper Thames River Source Protection Area includes all areas draining into the Thames River above the community of Delaware. This covers large parts of Oxford, Perth and Middlesex Counties including most of the City of London. Very small portions of Huron and Elgin Counties also drain into the upper Thames River. The area covers approximately 3,423 square kilometres with a total watershed population (2001) of about 472,000. There are no First Nations in the Upper Thames River Source Protection Area.

The residents of the Upper Thames River Source Protection Area receive their municipal drinking water from Lake Huron or Erie through 2 intakes in other Source Protection Areas. Many of the communities in Perth and Oxford Counties rely on groundwater for municipally supplied drinking water. Although the drinking water for much of the population of the Upper Thames is supplied from municipal drinking water sources, many rural residents rely on water from private wells.

IV. At a Glance: Progress on Source Protection Plan Implementation

1. Source Protection Plan Policies

P : Progressing Well/On Target:
For the policies that address significant drinking water threats in the TSR Source Protection Plan, 80% have being fully implemented. Another 16% are currently in progress, and for the remaining 4%, policy outcomes were evaluated and no further action was required. Further progress was also made to implement the significant non-legally binding policies, with 84% of those policies being fully implemented, and the remaining 16% requiring no further action.

2. Municipal Progress: Addressing Risks on the Ground

P : Progressing Well/On Target:
27 municipalities in the Thames-Sydenham and Region (TSR) have vulnerable areas where significant drinking water threat policies apply. These municipalities are required to ensure that their planning and building decisions conform with the Thames-Sydenham and Region SPP, and must also ensure that their Official Plan conforms with the SPP upon the next Planning Act review.

Half of the municipalities in the TSR that have an official plan (10 of 18) have completed their required Official Plan conformity exercises. Of the remaining 8 municipalities, 7 are in the process of amending their Official Plan, and one has not yet started.

All of the municipalities in our Source Protection Region that are responsible for day-to-day land use planning and building permit decisions, have integrated source protection requirements to ensure that their planning and building decisions conform with the policies in the TSR SPP.

3. Septic Inspections

P : Progressing Well/On Target: Under the Ontario Building Code, any on-site sewage system which has been identified as a significant drinking water threat is required to be inspected once every five years. In the Thames-Sydenham and Region there are seven municipalities which have on-site sewage systems that require mandatory inspection. Of those seven municipalities, four have completed all of the required inspections, while two municipalities are currently in the process of undertaking their inspections and two municipalities have not started.

4. Risk Management Plans

P : Progressing Well/On Target
Risk Management Officials and Inspectors throughout the Thames-Sydenham and Region reported that 2021 continued to be a challenging year to try and engage people to negotiate risk management plans due to the COVID-19 pandemic. Most RMO's and RMI's had to suspend in-person site visits when the pandemic was first declared in March 2020 and during each lockdown thereafter in 2021, with limited site visits that included extra safety precautions, resuming after each lockdown was lifted. Despite the challenging year, seven new Risk Management Plans were agreed to in 2020, bringing the Region's total Risk Management Plans to 65.
In The Thames-Sydenham and Region there are 18 municipalities who have areas were risk management plan policies apply. In 10 of those 18 municipalities, 100% of the expected risk management plans have already been agreed to or established.
Based on the responses provided by Risk Management Officials, it is estimated that about 70% of the anticipated risk management plans across the Region have been established. However, this assessment does not include some municipalities who are still in the process of verifying significant threats, and do not have an accurate assessment of the number of RMP's that will be required in their municipalities.
Although site visits were limited in 2021 due to the global pandemic (as discussed above), Risk Management Officials and Inspectors still managed to carry out 22 inspections to investigate activities that could either be prohibited or require a risk management plan.

5. Provincial Progress: Addressing Risks on the Ground

P : Progressing Well/On Target

Provincial ministries, including MECP, MNRF, MTO and OMAFRA, are responsible for the implementation of source protection policies included in the Thames-Sydenham and Region Source Protection Plan. These ministries are reviewing previously issued provincial approvals (e.g., prescribed instruments such as environmental compliance approvals issued under the Environmental Protection Act), where they have been identified as a tool in our plan to address existing activities that pose a significant risk to sources of drinking water. The provincial approvals are being amended or revoked where necessary to conform with plan policies. Our policies set out a timeline of 5 years to complete the review and make any necessary changes. The ministries have completed this for 100% of previously issued provincial approvals in our source protection region.

The above-noted Provincial Ministries have also established Standard Operating Policies to ensure that all new applications submitted for provincial approvals take into account the science generated through the Drinking Water Source Protection Program, and policies in the relevant source protection plan. Where necessary, new prescribed instruments are either being denied or issued with conditions added to ensure that the activity does not pose a significant threat to sources of drinking water.

6. Source Protection Awareness and Change in Behaviour

New, provincial standard road signs mark locations where well-used roads cross into zones where municipal drinking water sources are the most vulnerable to contamination. The road signs provide general public awareness about the sensitivity of the area. They will also alert first responders of the need to quickly inform the appropriate authorities so action can be taken to keep contaminants out of the public water treatment and distribution system. A total of 160 Drinking Water Protection Zone signs have been installed on roadways in the Thames-Sydenham Source Protection Region.

7. Source Protection Plan Policies: Summary of Delays

Incentive programs are not being considered by most organizations in the Thames-Sydenham Region as suggested by Policy 1.04 of the Source Protection Plan. If Provincial funding support were made available to help offset the costs of an incentive programs, more organizations would be open to the consideration of an incentive program.

Discretionary Septic System Maintenance Inspections programs targeting moderate and low septic system threats have not yet been considered by municipalities in the Thames-Sydenham and Region. Discretionary inspections are recommended in policy 3.01, and it should be noted that this is a non-legally binding policy. At this point in time, municipalities have been focusing on the mandatory septic inspections as required for septic systems that pose a significant threat to drinking water. More consideration will be given to discretionary inspections once the mandatory inspections are complete.

8. Source Water Quality: Monitoring and Actions

Microcystin at the Wheatley and Chatham/South Kent Surface Water Intakes
Harmful algal blooms (HABs) of blue-green algae (cyanobacteria) have been increasing in size and severity in recent years in the western basin of Lake Erie. Annual blooms have resulted in the closure of many Lake Erie beaches, as well as the shut-down of drinking water facilities on Pelee Island, and in Ohio. Microcystin-LR, a neurotoxin, is released when blue-green algae cells break down. All water treatment plants for Lake Erie systems in the Thames-Sydenham and Region have the treatment processes in place to remove microcystin-LR and provide safe drinking water during a bloom event. However, there is concern that some systems could be overwhelmed if HABs continue to increase in severity. The Great Lakes Water Quality Agreement (GLWQA) recognized that phosphorous is the limiting nutrient for cyanobacteria growth and, as such, contributes to the microcystin issue. The Conservation Authorities of the Thames-Sydenham and Region (TSR) are committed to working with senior levels of government and other partners to implement relevant actions to reduce phosphorous in our region. The TSR will also continue to consider all available data for the Wheatley and Chatham/South Kent intakes to determine whether microcystin-LR continues to be an issue for these water treatment plants.

Nitrates at the Wallaceburg Surface Water Intake
In October 2017, the Thames-Sydenham and Region Source Protection Committee (SPC) reviewed nitrate monitoring data collected between 2013 and 2017 for the Wallaceburg issue. The results of the monitoring were inconclusive and did not yield enough information to confirm the issue and delineate an Issue Contributing Area. Water treatment plant staff and managers for the Wallaceburg intake indicated that they no longer had any significant concerns regarding nitrate concentrations at the intake. The Assessment Report and Source Protection Plan will therefore be amended to indicate that nitrates are no longer an issue at the Wallaceburg intake.

Nitrogen at the Woodstock Well System
Nitrate occurs in the Thornton wellfield and Tabor wellfield of the Woodstock Drinking Water System. Nitrate levels are routinely above half of the treated water maximum allowable concentration (MAC) of 10 mg/L. Anthropogenic activities associated with agriculture, residential development and wetlands are known sources of nitrate in groundwater. Nitrates were therefore identified as an issue for both the Thornton and Tabor wellfields. An analysis of the nitrate levels in some of the wells for the Thornton wellfield revealed that nitrate levels may be leveling off or decreasing. Additional monitoring was recommended to determine whether an Issue Contributing Area (ICA) was required at the Thornton wellfield. Levels at the Tabor wellfield were significantly lower than those seen in the Thornton wellfield, but appeared to be trending upwards. The wellfield contains two highly productive wells that are a main supply of water to the system. An ICA was therefore delineated for the Tabor wellfield.
In their 2021 annual monitoring report, Oxford County indicated that there currently was not enough information available to determine changes to the concentration or trend of nitrates in either the Thornton or Tabor wellfields. The County will complete a review of the Thornton nitrate levels to determine whether the delineation of an Issue Contributing Area (ICA) is warranted.

9. Science-based Assessment Reports: Work Plans

No work plans were required to be implemented for our assessment reports.

10. More from the Watershed

To learn more about our source protection region, visit our Homepage:
https://www.sourcewaterprotection.on.ca/

Source Water Protection Annual Report

2021 - Policy Implementation Status Summary

SPR - Thames, Sydenham and Region

Implementation Status - Significant Legally Binding Policies

Implementation Status Category	Count of Plan Policies	Percent of Plan Policies
Implemented	328	79 %
Implemented: Policy outcome(s) evaluated - No further action(s) required	3	1 %
In progress/some progress made	68	16 %
No response required/not applicable	16	4 %
TOTAL	415	100 %

Source Water Protection Annual Report
2021 - Policy Implementation Status Summary
SPR - Thames, Sydenham and Region

Implementation Status - Significant Non Legally Binding Policies

Implementation Status Category	Count of Plan Policies	Percent of Plan Policies
Implemented	62	85 %
No response required/not applicable	11	15 %
TOTAL	73	100 %

Source Water Protection Annual Report
2021 - Policy Implementation Status Summary
SPR - Thames, Sydenham and Region

Implementation Status - Moderate/Low Policies

Implementation Status Category	Count of Plan Policies	Percent of Plan Policies
Implemented	110	81 %
In progress/some progress made	26	19 %
TOTAL	136	100 %

Source Water Protection Annual Report

2021 - Policy Implementation Status Summary

SPR - Thames, Sydenham and Region

Implementation Status – Non-threat specific policies

Implementation Status Category	Count of Plan Policies	Percent of Plan Policies
Implemented	45	69 %
In progress/some progress made	18	28 %
No response required/not applicable	2	3 %
TOTAL	65	100 %

Source Water Protection Annual Report

2021 - Policy Implementation Status Summary

SPR - Thames, Sydenham and Region

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question
10	True	As applicable to your source protection region/area, indicate if all relevant implementing bodies submitted a status update/annual report to the source protection authority for the previous reporting year. If "No" is selected for any implementing body(ies), then please complete the Comments field below with details including the name of the specific implementing body along with an explanation, if available, for not submitting a status update/annual report as required by a monitoring policy. *NOTE: Where a listed implementing body(ies) is not applicable/relevant to your source protection region/area, then simply select “No” and explain that it is not an applicable implementing body in your source protection region/area in the Comments field text box.

Response	Answer
Risk Management Official	Yes
Municipality	Yes
Conservation Authority	Yes
Local Health Unit	No
MECP - Waste Disposal Sites - Landfilling and Storage	Yes
MECP - Wastewater/Sewage Works	Yes
MECP - Pesticides	Yes
MECP - Hauled Sewage/Biosolids	Yes
MECP - Permit to Take Water	Yes
MECP - Municipal Residential Drinking Water Systems	Yes
MECP - Source Protection	Yes
MECP - Waste Disposal Sites - Landfilling and Storage Inspections	Yes
MECP - Wastewater/Sewage Works Inspections	Yes
MECP - Conditions Sites	No
MECP - NMA - ASM and NASM Inspections	Yes
OMAFRA	Yes
MNRF	Yes
MTO	Yes
MMAH	No
MGCS-TSSA	No
MENDM	No

Provincial Board/Commission	No
Federal Departments/Agencies/Commissions/Crown Corporations	No
Private Entity/Company	No
Association/Organization	No
MECP - Hauled Sewage/Biosolids Inspections	Yes
MECP - Permit to Take Water Inspections	Yes
MECP - Municipal Residential Drinking Water Systems Inspections	Yes
MECP - Environmental Monitoring	Yes
MECP - Fuel	Yes
MECP - Great Lakes	Yes
MECP - Spills Response	Yes
MECP - Wells	Yes

Comment: All implementing bodies met the February 1st deadline to report on their implementation efforts in 2019. All "NO" responses are because that body is not named as an implementing body in the Thames-Sydenham & Region Source Protection Plan.

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question	Category
20	True	Did the Source Protection Authority (i) indicate the status of all threat policies as contained in their source protection plan by using one of the two options outlined in the guidance document (ID 20a) AND (ii) either provide details in the response field text box in section 2 for policies with a "No Progress Made" and "No information available/no response received" implementation status OR complete the table as part of reportable ID 20b in the Excel Workbook for those policies with a "No Progress Made" and "No information available/no response received" implementation status (only if also submitting the Excel Workbook), especially for legally-binding policies that address significant drinking water threat activities and for any moderate/low threat policies that use prescribed instruments and Planning Act tools. Please refer to the instructions provided for EAR Reportable ID 20 in the Guidance document which can be found in the FAQ section of the EAR online tool.	Implementation status of source protection plan policies

Answer: Yes

Comment:

Report Id	Completed	Question
30	True	Number of risk management plans agreed to or established within the source protection area/region (to address existing and future threats) in this reporting period (i.e., annual total).

	Current Year	Cumulative Count
	7	69
Provincial Total	7	69

Comment:

Report Id	Completed	Question
31	True	Number of properties (i.e., parcels) with risk management plans agreed to or established in this reporting period.

	Current Year	Cumulative Count
	7	68
Provincial Total	7	68

Comment:

Report Id	Completed	Question
32	True	How many existing* significant drinking water threats have been managed through the established risk management plans in this reporting period (* meaning engaged in OR enumerated as existing significant threats)?

	Current Year	Cumulative Count
	13	134
Provincial Total	13	134

Comment:

Report Id	Completed	Question	Category
33	True	If known, please state the percentage of risk management plans that have been established to date in relation to the ones still needed/pending to manage EXISTING significant drinking water threat activities. [OPTIONAL]: You may also include a description of the effort and time dedicated to getting the risk management plans in place in the Comments field.	Part IV (Sections 57, 58 & Section 59)

Answer: 58

Comment: Based on the responses provided by Risk Management Officials, we are estimating that about 58% of the anticipated risk management plans have already been agreed to or established. However, there are some municipalities that are still in the process of verifying significant threats and do not have an accurate assessment of the number of RMP's that will be required in their municipalities, and were therefore unable to provide a response to this question. Those municipalities were left out of the above estimate. In The Thames-Sydenham and Region there are 18 municipalities who have areas were risk management plan policies apply. In 8 of those 17 municipalities, 100% of the expected risk management plans have already been agreed to or established.

Report Id	Completed	Question	Category
34	True	Since their establishment, were any risk management plans cancelled within the source protection region/area because of updates or amendments or other changes? If yes, please state how many. If no, please enter "0". Note: This count should be the cumulative count of all risk management plans that have been cancelled over any of the previous reporting years. See guidance for more details.	Part IV (Sections 57, 58 & Section 59)

Answer: 0

Comment:

Report Id	Completed	Question
40	True	How many section 59 notices were issued in this reporting period for activities to which neither a prohibition (section 57) nor a risk management plan (section 58) policy applied, as per ss. 59(2)(a) of the Clean Water Act?

	Current Year	Cumulative Count
	12	125
Provincial Total	12	125

Comment:

Report Id	Completed	Question
41	True	How many section 59 notices were issued in this reporting period for activities to which a risk management plan (section 58) policy applied, as per ss. 59(2)(b) of the Clean Water Act?

	Current Year	Cumulative Count
	3	18
Provincial Total	3	18

Comment:

Report Id	Completed	Question
50	True	For the purposes of section 61 of O. Reg. 287/07, how many notices and/or copies of prescribed instruments that state the prescribed instrument conforms with the significant drinking water threat policies in the source protection plan (i.e., statement of conformity confirms the instrument holder is exempt from requiring a risk management plan) did the risk management official receive in this reporting period?

	Current Year	Cumulative Count
	1	7
Provincial Total	1	7

Comment:

Report Id	Completed	Question	Category
60	True	Provide a brief overview of inspections that were carried out for activities that are prohibited under section 57 or require a risk management plan under section 58 of the Clean Water Act. You may wish to include a brief summary of inspection results and an overall indication of compliance. If no inspections were conducted in the previous calendar year, please explain. [OPTIONAL]: If you wish to share any insights or feedback about the compliance process in general, please do so.	Part IV (Sections 57, 58 & Section 59)

Answer: Due to the COVID-19 pandemic, only a limited number of on-site inspections were carried out by Risk Management Officials and Inspectors in the Thames-Sydenham and Region. Most Risk Management Officials reported that inspections in 2021 were carried out as drive-by/windshield surveys and phone calls and compliance with risk management plans were confirmed through email and telephone correspondence.
In Oxford County, 12 inspections were completed. Most were regarding DNAPLs or fuel oil. These activities were thought to require a Risk Management Plan, but were then found not to meet the circumstances. No non-compliance issues were found.

Comment:

Report Id	Completed	Question
61	True	State the total number of inspections (including any follow-up site visits) that were carried out for activities (existing or future) that are prohibited under section 57 of the Clean Water Act in this reporting period.

	Current Year	Cumulative Count
	22	164
Provincial Total	22	164

Comment:

Report Id	Completed	Question
62	True	Among the inspections conducted for section 57, how many showed that activities were taking place on the landscape even though they were prohibited (i.e., in contravention) under section 57 of the Clean Water Act in this reporting period?

	Current Year	Cumulative Count
	0	0
Provincial Total	0	0

Comment:

Report Id	Completed	Question
70	True	How many existing significant drinking water threats have been prohibited as a result of section 57 prohibitions in this reporting period?

	Current Year	Cumulative Count
	0	15
Provincial Total	0	15

Comment:

Report Id	Completed	Question
80	True	State the total number of inspections (including any follow-up site visits) that were carried out for activities that require a risk management plan under section 58 of the Clean Water Act in this reporting period.

	Current Year	Cumulative Count
	30	835
Provincial Total	30	835

Comment:

Report Id	Completed	Question
81	True	Among the inspections conducted for section 58, how many were in contravention with section 58 of the Clean Water Act in this reporting period (i.e., person engaging in a drinking water threat activity without a risk management plan as required by the source protection plan)?

	Current Year	Cumulative Count
	34	35
Provincial Total	34	35

Comment: 12 out of the 34 were in Oxford County.

Report Id	Completed	Question
82	True	Among the inspections for section 58, how many were in non-compliance with the specific contents of the risk management plan in this reporting period? (NOTE: Please only include those inspections that showed non-compliance with measures/conditions to manage the actual threat activity.)

	Current Year	Cumulative Count
	6	6
Provincial Total	6	6

Comment:

Report Id	Completed	Question
83	True	State the total number of notices issued where there were cases of contraventions and/or non-compliance found with section 57 in this reporting period.

	Current Year	Cumulative Count
	1	1
Provincial Total	1	1

Comment:

Report Id	Completed	Question
84	True	State the total number of notices issued where there were cases of contraventions and/or non-compliance found with section 58 in this reporting period.

	Current Year	Cumulative Count
	0	0
Provincial Total	0	0

Comment:

Report Id	Completed	Question
85	True	State the total number of orders issued for contraventions and/or non-compliance found with section 57 in this reporting period.

	Current Year	Cumulative Count
	0	0
Provincial Total	0	0

Comment:

Report Id	Completed	Question
86	True	State the total number of orders issued for contraventions and/or non-compliance found with section 58 in this reporting period.

	Current Year	Cumulative Count
	1	1
Provincial Total	1	1

Comment:

Report Id	Completed	Question
220	True	List the municipality(ies) (including upper-, lower-, and single-tier) within the source protection region/area that are required to complete Official Plan and Zoning by-law conformity exercises for source protection and indicate the status of those exercises for each listed municipality. *NOTE: Applies to every municipality affected by land use planning or Part IV type policies. Where the official plan and/or zoning by-law status for any particular municipality needs to be changed/updated, then please do so by deleting the entry for that particular municipality by clicking on the red "-" (minus) sign and then re-select the municipality name from the drop down list of municipalities followed by selecting the updated status of the conformity exercise for the official plan and zoning by-law from the drop down list for that particular municipality. After doing so, please be sure to add the municipality as your response by clicking on the green plus sign.

Municipality	Official Plan	Zoning By Law
City of London	Completed	Completed
Municipality of Thames Centre	Completed	Completed
Township of St. Clair	Completed	Completed
City of Stratford	Completed	In Progress/Updates Underway
Municipality of Lambton Shores	Completed	In Progress/Updates Underway
Municipality of Middlesex Centre	Completed	In Progress/Updates Underway
Essex, County of	Completed	Not Applicable
Lambton, County of	Completed	Not Applicable
Middlesex, County of	Completed	Not Applicable
Town of Plympton-Wyoming	Completed	Not Started
Municipality of Chatham-Kent	In Progress/Updates Underway	In Progress/Updates Underway
Town of Lakeshore	In Progress/Updates Underway	In Progress/Updates Underway
Town of St. Marys	In Progress/Updates Underway	In Progress/Updates Underway
Oxford, County of	In Progress/Updates Underway	Not Applicable
Perth, County of	In Progress/Updates Underway	Not Applicable
Municipality of Leamington	In Progress/Updates Underway	Not Started
City of Woodstock	Not Applicable	In Progress/Updates Underway
Town of Ingersoll	Not Applicable	In Progress/Updates Underway
Township of East Zorra-Tavistock	Not Applicable	In Progress/Updates Underway
Township of Norwich	Not Applicable	In Progress/Updates Underway
Township of South-West Oxford	Not Applicable	In Progress/Updates Underway

Township of Zorra	Not Applicable	In Progress/Updates Underway
Municipality of West Perth	Not Applicable	Not Started
Township of Perth East	Not Applicable	Not Started
Township of Perth South	Not Applicable	Not Started
Village of Point Edward	Not Started	Not Started

Comment:

Report Id	Completed	Question
240	True	State the number of source water protection signs installed on provincial highways in the source protection region/area in this reporting period.

	Current Year	Cumulative Count
	0	6
Provincial Total	0	6

Comment:

Report Id	Completed	Question
241	True	State the number of source water protection signs installed on municipal roads in the source protection region/area in this reporting period.

	Current Year	Cumulative Count
	0	153
Provincial Total	0	153

Comment:

Report Id	Completed	Question
242	True	State the number of source water protection signs installed at other locations (if applicable) in the source protection region/area in this reporting period.

	Current Year	Cumulative Count
	0	4
Provincial Total	0	4

Comment:

Report Id	Completed	Question	Category
260	True	Current total overall number of on-site sewage systems that are assessed as significant drinking water threat activities and that are required to be inspected every five years in accordance with the Ontario Building Code.	Sewage System Inspections

Answer: 146

Comment:

Report Id	Completed	Question	Category
261	True	Of those requiring inspections, how many inspections of on-site sewage systems were due to be carried out in this reporting period? If not applicable or no inspections of on-site sewage systems were due to be carried out in this reporting period because they were already inspected earlier within the inspection cycle or will be inspected in a future year within the cycle, then please enter "0" and state either explanation in the comment field.	Sewage System Inspections

Answer: 51

Comment:

Report Id	Completed	Question	Category
262	True	How many on-site sewage system inspections were completed in this reporting period?	Sewage System Inspections

Answer: 36

Comment:

Report Id	Completed	Question
263	True	How many of the inspected on-site sewage systems required minor maintenance work in this reporting period?

	Current Year	Cumulative Count
	0	20
Provincial Total	0	20

Comment:

Report Id	Completed	Question
264	True	How many of the inspected on-site sewage systems required major maintenance work (e.g., tank replacement, etc.) in this reporting period?

	Current Year	Cumulative Count
	1	4
Provincial Total	1	4

Comment: Thames Centre - Septic Bed replacement at 1 existing property

Report Id	Completed	Question	Category
265	True	How many of the inspected on-site sewage systems required no maintenance work?	Sewage System Inspections

Answer: 35

Comment:

Report Id	Completed	Question
266	True	For those on-site sewage systems that were not inspected in this reporting period but should have been inspected, and are now out of compliance, please indicate why they were not all inspected from among the reasons below. [Note: For municipalities that have not yet initiated the mandatory on-site sewage system inspection program, please see the next reportable to provide your response if this is the case].

Response	Answer
landowner refused entry, compliance order being sought	Yes
other. Please specify in the comment box below.	Yes
inspections delayed/postponed due to COVID-19 restrictions	Yes
vulnerable area changed and on-site sewage system(s) no longer a threat activity	Yes

Comment: Inspections in some municipalities were all completed in previous years, and the next round of inspections has not yet begun.

Chatham-Kent - There were originally 20 septic systems in the Highgate WHPA that were inspected. However, the Highgate well system was officially decommissioned in 2019, so they are no longer threats since the WHPA went away. There are only 3 septic systems that remain in Ridgetown that were previously inspected.

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question	Category
267	True	If applicable, please indicate if any municipality(ies) has not yet established or initiated the mandatory on-site sewage system inspection program (i.e., the first inspection cycle) in your source protection region/area. As part of your response, please indicate the name of the municipality(ies), the reason(s) for not yet initiating the mandatory on-site sewage inspection program (if known) and the steps that have been taken to ensure compliance with the mandatory inspection program.	Sewage System Inspections

Answer: n/a

Comment:

Report Id	Completed	Question
270	True	Complete the information below regarding environmental monitoring of drinking water issues identified in accordance with the Technical Rules within your source protection region/area. Begin by selecting the drinking water system, the specific well or intake, the drinking water issue, the delineation status, and the observation of the concentration. [OPTIONAL}: In the comments field, describe any actions or behavioural changes that might be contributing to reported changes in the concentration of the issue or parameter. Where the drinking water issue, well or intake, delineation status, or observation of any previously listed drinking water system needs to be changed/updated, then please do so by deleting the entry for that particular drinking water system by clicking on the red minus sign on the right side of the entry and then re-select the drinking water system from the dropdown list of drinking water systems followed by selecting the associated well or intake, the drinking water issue, its delineation status, and the observation from the dropdown list for that particular drinking water system. After doing so, please be sure to add the drinking water system as your response by clicking on the green plus sign on the right side of the entry. If this reportable is not applicable to your source protection region/area, please indicate as such by choosing "No system with issues," "Not Known/Available," "No issue," "Not applicable," and "No observation," respectively, under the drop down menu options under each of the categories of this reportable. Do not leave blank.

DWIS Number	DWIS Name	Issue	ICA Delinated	Observation
220003332	Wheatley system	Microsystin LR	No	No Change in Concentration / Trend
220003378	Chatham/South Chatham-Kent System	Microsystin LR	No	No Change in Concentration / Trend
220003341	Wallaceburg System	Nitrate	No	No Longer Monitoring - issue improved
220000709	Woodstock Well Supply	Nitrogen	Yes	Not Enough Data
220000709	Woodstock Well Supply	Nitrogen	No	Not Enough Data

Comment: Woodstock (Tabor Wellfield), Nitrogen, Yes, Not Enough Data/Information Available to Determine Changes in Concentration/Trend; Woodstock (Thornton Wellfield), Nitrogen, No, Not Enough Data/Information Available to Determine Changes in Concentration/Trend; University of Waterloo (UofW) have been completing groundwater studies within the Thornton Wellfield. UofW have indicated the elevated nitrates have been identified with monitoring wells within upgradient of the Thornton Wellfield.

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question
280	True	How many notices about transport pathways (meaning a condition of land resulting from human activity (e.g., pits and quarries, improperly abandoned wells, geothermal system, etc.) that increases the vulnerability of a raw water supply of a drinking water system) did the source protection authority receive from municipalities in this reporting period (as per O. Reg. 287/07, ss. 27(3))?

	Current Year	Cumulative Count
	0	1
Provincial Total	0	1

Comment: Question not asked in 2021.

Report Id	Completed	Question
281	True	Where transport pathway notices were received, indicate the action(s) taken by the source protection region/area in response to receiving these notices:

Response	Answer
Provided information to municipalities about changes in vulnerability	No
Provided notice to Source Protection Committee for information	No
Situation continues to be monitored	No

Comment: N/A

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question
300	True	[OPTIONAL]: If and where there are successful examples for each of the following initiatives in the source protection region/area (including from local municipalities, residents and businesses) that occurred in this reporting period that the authority wishes to highlight, then please indicate in the Comments field below. In your comments, please include details for each of the selected topics. Please limit the descriptions provided (e.g., one example for each topic or more could be included when the source protection authority feels they are exceptional/quite successful).

Response	Answer
Education and Outreach (in description include details, if available, on type and percentage of target population reached, outcome(s) achieved, etc.)	Yes
Incentives (in description include details, if available, on outcome(s) achieved, how widely available was the incentive, etc.)	No
Stewardship Programs	Yes
Best Management Practices	Yes
Pilot Programs	Yes
Research	Yes
Specify Action (e.g., road salt management, municipal by-laws, legislative or regulatory amendments, mapping, review of fuel codes, new airport facility design standards to manage runoff of chemicals from de-icing of aircraft, instrumentation, etc.)	Yes
Climate Change (e.g., data collection)	Yes
Spill prevention/spill contingency/emergency response plan updates	Yes
Transport pathways	Yes
Water quantity	No
Great Lakes	Yes
Other policies (i.e., strategic action, etc.)	Yes

Comment: Stratford: With the increase of online learning in schools, we engaged with a few teachers and arranged presentations for Stratford HS classes which explained out water and wastewater process with a section focused solely on SWP. We piloted a new Dead End Hydrant Flushing Optimization Program in 2021 with a focus on water conservation through improved flushing practices.

Sarnia: The City of Sarnia developed a Sarnia Emergency Management "Guideline for communication & response for spills that could impact municipal drinking water sources" in 2017 and a special training exercise was held for the City's emergency response Primary Control Group in December 2017. In 2018, a workshop was held and the Source Protection Authority provided guidance materials for Transport Pathways. No additional public activities or council policy actions due to Covid in 2020. Ongoing BMP's including contracted RMO services and expertise added in late 2020

Plympton-Wyoming - Specify action: Application of Salt Sand is Tracked yearly by staff utilizing a events calendar along with purchasing receipts and Calibration of equipment; implemented a prewetting program. Spill prevention: Spill kits are on hand to apply if needed! Emergency calls to SAC and to local contractors for clean up measures

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question
305	True	Complete the table below with the count data for each significant drinking water threat activity/local threat activity/condition being engaged in (i.e., enumerated as 'existing' significant threats) at the time of source protection plan approval or approval of amendments that include new / changing protection zones. Please use the best available information/desktop exercises, reports from Risk Management Officials, and other implementing bodies to provide the counts below. For convenience, the count data from the previous reporting year have been copied over, but please be sure to review, edit, and confirm the counts for accuracy in the table below. *NOTE: SPAs are strongly encouraged to refer to the Guidance document for additional details and instructions on completing this table.

ThreatId	Threat	A	B	C	D
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	36	1	21	9
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	264	0	80	91
3	The application of agricultural source material to land.	90	0	17	34
4	The storage of agricultural source material.	12	4	6	5
5	The management of agricultural source material.	0	0	0	0
6	The application of non-agricultural source material to land.	34	0	15	2
7	The handling and storage of non-agricultural source material.	0	0	0	0
8	The application of commercial fertilizer to land.	57	7	14	29
9	The handling and storage of commercial fertilizer.	23	4	13	9
10	The application of pesticide to land.	57	1	17	15
11	The handling and storage of pesticide.	19	0	16	1
12	The application of road salt.	0	0	0	0

13	The handling and storage of road salt.	0	0	0	0
14	The storage of snow.	2	0	2	0
15	The handling and storage of fuel.	90	6	53	13
16	The handling and storage of a dense non-aqueous phase liquid.	259	51	199	86
17	The handling and storage of an organic solvent.	35	4	21	14
18	The management of runoff that contains chemicals used in the de-icing of aircraft.	0	0	0	0
19	Water taking from an aquifer without returning the water to the same aquifer or surface water body	0	0	0	0
20	Reducing recharge of an aquifer	0	0	0	0
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. O. Reg. 385/08, s. 3.	34	0	18	5
22	The establishment and operation of a liquid hydrocarbon pipeline	0	0	0	0
1000	Water conditioning salts from water softeners	0	0	0	0
1001	Transportation of specified substances along corridors	0	0	0	0
1002	Spill of Tritium from Nuclear Generating Station	0	0	0	0
1003	Handling storage of fuel	0	0	0	0
1004	Transportation, storage and handling of diesel/gasoline	0	0	0	0
1005	Transportation of Agricultural and Non-Agricultural Source Materials	0	0	0	0
1006	International Shipping Channel within IPZ2	0	0	0	0
1007	Transportation of hazardous substances along transportation corridors	0	0	0	0
1008	Transportation or Storage and Handling of Fuel in an Event Based Area	46	4	29	12

1009	Waterfowl		0	0	0	0
1010	Local condition		0	0	0	0
325	619	**Totals:**	**1058**	**82**	**521**	**325**

Comment:

MECP Calc D/(A+B-C): **53 %**

Report Id	Completed	Question	Category
310	True	Please provide comments below to explain the overall progress made in addressing these significant threats and include the percentage of overall progress made within the comments provided. The percentage of overall progress made in addressing local threats and conditions that are taking place on the landscape is determined by taking the total number in column D (i.e., significant drinking water threat addressed because policy is implemented) from the table in reportable ID 305 and dividing it by the number that is derived by adding the total numbers in columns A and B and then subtracting this sum total from the total in column C. In other words, overall progress made = D/(A plus B minus C).	Addressing existing enumerated threats

Answer: Overall progress made is 53 %

There were 1,058 threats included in the original enumeration and subsequently 82 new threats have been identified after the Source Protection Plan was approved. Of those threats 521 were determined to not be present/or no longer a occurring on the landscape. There are 325 threats that are being managed.

Comment:

Report Id	Completed	Question	Category
320	True	If applicable to the assessment report in your source protection region/area, provide a summary of steps taken to further assess or implement the plans of work described in technical rule 30.1: Water Budget Tier 3 not included in your original assessment report(s).	Assessment report information gaps

Answer: N/A

Comment:

Report Id	Completed	Question	Category
321	True	If applicable to the assessment report in your source protection region/area, provide a summary of steps taken to further assess or implement the plans of work described in technical rule 50.1: GUDI for WHPA-E or F not included in your original assessment report(s).	Assessment report information gaps

Answer: N/A

Comment:

Report Id	Completed	Question	Category
322	True	If applicable to the assessment report in your source protection region/area, provide a summary of steps taken to further assess or implement the plans of work described in technical rule 116: Issue Contributing Area not included in your original assessment report(s).	Assessment report information gaps

Answer: N/A

Comment:

Report Id	Completed	Question	Category
330	True	Does the source protection authority have any other item(s) on which it wishes to report? If so, please explain.	Other reporting items

Answer: No other items to report on.

Comment:

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question	Category
340	True	What positive outcomes (e.g., less water consumption, changes in behaviour, reduction in phosphorus and nitrogen concentrations, less chloride from road salt, reduction in algal blooms, human health protected, etc.), if any, have potentially resulted from the implementation of source protection plan policies? Please describe the outcomes below.	Source protection outcomes

Answer:

Here are some comments from our municipalities:
Lambton County: Public and business community awareness of the existence of drinking water threats. Protection of human health.
City of London: Our ongoing Water conservation program has reduced consumption and increased awareness of our source of drinking water.
Oxford County: Changes in behaviour has been noted. More people are aware of the Source Protection program and less apprehensive to setting up site visits.
St. Clair Township: Increase in general public and public sector awareness of source protection. Incorporation of source protection into public works regular business practices. New industry is being reviewed with a source protection lens to include spills prevention in site planning.

Comment:

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question
350	True	In the opinion of the Source Protection Committee, to what extent have the objectives of the source protection plan been achieved in this reporting period?

Response	Answer
Progressing Well/On Target - The majority of the source protection plan policies have been implemented and/or are progressing well	Yes
Satisfactory - Some of the source protection plan policies have been implemented and/or are progressing well	No
Limited Progress made - A few of the source protection plan policies have been implemented and/or are progressing well	No

Comment:

Source Water Protection Annual Report
2021 - Supplemental Form
SPR - Thames, Sydenham and Region

Report Id	Completed	Question	Category
351	True	Please provide comments to explain how the Source Protection Committee arrived at its opinion. Include a summary of any discussions that might have been had amongst the Source Protection Committee members, especially where no consensus was reached.	Achievement of source protection plan objectives

Answer:

December 31st, 2021 marked six years since our Source Protection Plan first took effect. In that time significant progress has been made to implement the policies contained in the plan, and address the activities that were identified as posing a risk to our municipal drinking water supplies. To date, 80% of the policies in the plan that address significant drinking water threats have been fully implemented, with the remaining 20% progressing well.

That being said, 2021 continued to be a difficult year for everyone due to the COVID-19 pandemic, and for those working in source protection, it was no exception. Risk Management Officials and Inspectors throughout the region put a pause on all site visits during each lock down that occurred and resumed as lock downs lifted. Most Risk Management Officials and Inspectors have reported that it has been a challenging time to try and engage people to negotiate risk management plans, with many businesses just focused on saving or maintaining their operations. In addition, there has been many businesses that have closed during this pandemic while other businesses has started up. Risk Management Officials understood those challenges, and continued their efforts to ensure that municipal drinking water supplies were protected without creating undue hardships for businesses. An additional seven Risk Management Plans were established over the reporting period bringing the Region's total Risk Management Plans to 65.

Approximately 53% of the 1058 originally identified significant drinking water threats have been successfully managed or eliminated. While there is still a considerable amount of work to do to address the remaining threats, the Thames-Sydenham and Region Source Protection Committee is pleased to see that policy implementation is moving steadily forward. For that reason, they believe that a ranking score of progressing well and on target is a fair assessment on our implementation progress.

Comment:

Thames – Sydenham and Region Drinking Water Source Protection
Source Protection Committee Discussion Paper

Report to	Chair and members Thames – Sydenham and Region Source Protection Committee	**Agenda #**	7b. 2022.03.25
Cc	SP Management Committee	**Date**	March 25, 2022
Prepared By	Julie Welker, Source Protection Coordinator		
Re:	S.36 Consultation		

Purpose

To present the Source Protection Committee (SPC) with the timeline for consultation for amendments to the Thames-Sydenham and Region Assessment Reports (ARs) and Source Protection Plan (SPP) as part of the order from the Minister of the Environment, Conservation and Parks under s.36 of the *Clean Water Act*.

Background

At the March 13th, 2020 meeting of the Thames-Sydenham and Region Source Protection Committee, the Committee reviewed some of the proposed amendments to be included in the Section 36 update to the SPP and AR's. This report provided a summary of the proposed amendments to be included in the Section 36 update and to move forward with early engagement on the proposed amendments.

Discussion

Summary of the proposed amendments are summarized below:

Wallaceburg Nitrate Issue

Proposed Amendment: Update the SCR Assessment Report to indicate that nitrates are no longer an issue for the Wallaceburg drinking water system and remove Policy 4.13 from the SPP.

Shakespeare and Ridgetown WHPA Delineations

Proposed Amendment: Update to the Shakespeare and Ridgetown DWS information and mapping to reflect changes to number of wells and well locations. Note: Ridgetown has been deferred and will be done through a section 34 at a later date.

Livestock Grazing and Pasturing in the Town of St. Marys

Proposed Amendment: Change the Section 58 Risk Management Plan policy for Livestock Grazing and Pasturing to a Section 57 Prohibition policy for the Town of St. Marys only. Policy would apply in WHPA-A and WHPA-B where the vulnerability score is 10.

Risk Management Plan Policy Timeline for Existing Threats

Proposed Amendment: To add a timeframe of eight years to all Section 58 Risk Management Plan policies in the Thames-Sydenham and Region SPP with the exception of those policies that apply in Oxford County. This would require risk management plans to be established for all existing significant threats identified at the time of the initial SPP approval by December 31st, 2023.

Oxford County re-modeling of WHPAs

Proposed Amendment: Updating the WHPA delineations and vulnerability scores for the Beachville, Ingersoll, Mount Elgin, Woodstock and Thamesford drinking water systems using the Tier 3 Water Budget Models.

Timeline for Consultation

No.	Step	Task and Timeline
1	Need for Update is identified	2018: S.36 workplan completed by SPR and Minister's Order issued under s.36
2	Development of updates to documents in consultation with the SPC and municipalities	2019-2021
3	**Early engagement with MECP**	• Sent documents to MECP on February 11, 2022 • Receive MECP comments • Address MECP comments, update documents and email the pre-consultation package to the SPC • Receive and address SPC comments
4	**Pre-consultation**, in two steps: a) With all policy implementers; and b) With persons/businesses believed to be engaged in significant threats	April – May (approx. 4 weeks) ○ Post pre-con documents on secure website (SharePoint) ○ Email notices to policy implementations ○ Receive pre-con comments • Address pre-con comments • Prepare public consultation package
6	**Public Consultation** (min 35 days)	June (Min. 35 days) Involves: • Public posting • Receive public comment • Address comments • Update documents and send to SPC • Receive SPC comments • Address SPC comments and prepare all documents for the SPC meeting • SPC meeting • Source Protection Authority (SPA) board reports and Management Committee report to be completed • Management Committee meeting • SPA 1 meeting; SPA2 meeting: SPA3 meeting to seek endorsement of the final submission by the boards • Prepare all supporting documentation and files including GIS shapefiles to submit to MECP
7	Submission to MECP (including all supporting documentation)	July-August Must be within 6 months of completion of consultation. Follow the MECP guidance bulletin for submissions.

Recommendation

That the SPC approve the comments received by MECP and the timeline for s.36 consultation.

If MECP comments come post SPC meeting on March 25, 2021, it is recommended that the SPC approve the comments via email.

Thames – Sydenham and Region Drinking Water Source Protection
Source Protection Committee Discussion Paper

Report to	Chair and members Thames – Sydenham and Region Source Protection Committee	**Agenda #**	7ci.2022.03.22
Cc	SP Management Committee	**Date**	March 25, 2022
Prepared By	Julie Welker, Source Protection Coordinator		
Re:	Approved Updates to Directors' Technical Rule Changes for Source Protection		

Purpose

To provide details to the Source Protection Committee (SPC) on the approved updates to the Directors' Technical Rules.

Background

The Source Protection Programs Branch (SPPB) initiated a project to review the source protection framework and propose amendments to the Director's Technical Rules (Rules) in 2014/15 after the first round of planning. The purpose of this project is to address challenges identified during the implementation of source protection plans, recommendations made in the 2014 Auditor General Report, and lessons learned during the development of the source protection plans and assessment reports. This project was divided into two phases, with the first phase of amendments finalized in March 2017.

On August 11, 2020, the Ministry of the Environment, Conservation and Parks (MECP) released proposed updates to the Director's Technical Rules on the Environmental Registry (ERO # 019- 2219). These changes were approved in December 2021. The approved changes are aimed to help ensure that the quality of Ontario's drinking water continues to be protected and supported by current science.

The approved changes and supporting materials can be found on the Province of Ontario's website (https://www.ontario.ca/page/2021-technical-rules-under-clean-water-act).

The approved amendments to the Director's Technical Rules include:

- Surface water vulnerability – delineation of Intake Protection Zone 1 (IPZ-1) and scoring of IPZ-2
- Impervious surface area – calculation of percentage of impervious area
- Drinking water issues – delineation of Issue Contributing Areas
- Conditions – identification of a condition site
- Alternative approach request – administrative requirements to seek Director's approval
- Local activity / threat – requirements to designate a local activity as a risk
- Climate change assessment – specify what needs to be included in an assessment report if climate impact assessment (CIA) is conducted
- Drinking water threats – updates to the circumstances, e.g. waste, sewage, road salt, storage of snow, DNAPLs, fuel

Discussion

Thames-Sydenham and Region staff have been reviewing the approved changes in consultation with other source protection regions and MECP staff. While there are still more questions to be answered, staff are moving ahead with identifying the priority changes to ensure those are on the top of the list to be implemented. More details about the approved changes along with staff expectations about the local implications of the changes are provided in the attached summary report. Thames-Sydenham and Region Source Protection Committee members are encouraged to review the approved changed to the Director's Technical.

Recommendation

That Report 2022.03.25 7(d) is received for information AND THAT the Thames-Sydenham and Region Source Protection Committee direct TSR staff to finalize the review of the approved changes to the Director's Technical Rules, on behalf of the Thames-Sydenham and Region Source Protection Committee.

Director Technical Rules, Phase II Amendments Interpretation of Impacts for the Thames-Sydenham Region Source Protection Authority

The following is an interpretation of the approved amendments to the Technical Rules as they pertain to the Thames-Sydenham Region Source Protection Authority. Prepared by Julie Welker, Source Water Protection Coordinator.

Climate Consideration

The previous version of Rule 15(3) indicated that the Director would provide direction in the case that the SPC was required to consider climate data. The current version of the Rule indicates that considering climate data itself is optional, but specifies the requirements for including such an assessment.

Current Approach	Does not stipulate the information needed to conduct a climate change risk assessment for water quality; Infers that Rule will only apply if the SPC is **required** to include
Objective of Amendment	Used an improved scientific method
Approved Amendment	Specify the information to be incorporated into the assessment report (e.g.: description of approach and data sources) **should** a municipality / source protection authority decide to evaluate the impact of climate change to drinking water sources.
Impact for TSR	The tool provided by CO could be used to determine whether climate change poses any increased risk to water quality. This work is not financially supported by the Province through the transfer payment agreement for Source Water. Once this exercise is complete, it is not clear whether the Province will support necessary updates to policies.
Enabling or Mandatory	Enabling.

2017 Rule 15(3)
If, in preparing an assessment report, the source protection committee **is required by these rules** to consider climate data in making a determination or performing a task, **the Director may give directions to the committee** for the purpose of ensuring that impacts from climate change are taken into account, including directing the committee to: - use a climate data set provided by the Director; or - use any climate data gathered by the committee in the manner specified by the Director.
2021 Rule 15(3) – final approved version with changes from proposed version shown
If an assessment report includes ~~source protection committee prepares~~ **a climate risk** ~~impact~~ **assessment** in relation to a wellhead protection area or intake protection zone delineated in the assessment report ~~and the source protection committee intends to use the findings of the impact assessment in the assessment report~~**, the following shall be included in the assessment report**: - An explanation of why specified climate data sets were used as the basis for the climate change impact assessment; - A summary of the findings of the climate change impact assessment; - A description of the approach used by the source protection committee to evaluate the

vulnerability of a drinking water system to climate impacts identified in the climate change impact assessment; and

- An explanation of the results of the evaluation under subrule (3), including whether the evaluation concluded that the drinking water system is resilient to the climate impacts identified in the climate change impact assessment.

Impervious Area

The approved amendment uses a new, improved method for calculating impervious area

Current Approach	Use of a 1km grid to determine impervious area
Objective of Amendment	Uses an improved scientific method
Approved Amendment	Grid approach is no longer required
Impact for TSR	Impervious Area will need to be recalculated using the new method
Enabling or Mandatory	Enabling, but necessary to determine new threat circumstances.

2017 Rule 16(11) and 17
16(11) For each vulnerable area, one or more maps of the **percentage of the impervious surface area where road salt can be applied per square kilometre in vulnerable area**. Mapping the percentage of impervious surface area is not required for an area in a vulnerable area where the vulnerability scores for that area is less than the vulnerability score necessary for the application of road salt to be considered a significant, moderate or low threat in the Table of Drinking Water Threats. Each map prepared in accordance with this sub rule shall be labelled the "total impervious surface area map". 17. For the purposes of sub rule 16(11), the location of a square kilometre in a vulnerable area shall be determined by overlaying a 1 kilometre by 1 kilometre grid over the vulnerable area with a node of the grid centered on the centroid of the source protection area.
2021 16(11) and 17 – final approved version (no change from proposed version)
16(11) For every highly vulnerable aquifer or each area of a wellhead protection area and intake protection zone identified in clause 9 (b), one or more maps showing the **percentage of impervious surface areas where road salt application in those areas is or would be a significant, moderate or low threat** as determined in accordance with the Table of Drinking Water Threats.

Where an area identified in clause 9 (b) has two or more vulnerability scores, the percentage of impervious surface area may be determined for each sub-area with the same vulnerability score. Each map prepared in accordance with this sub rule shall be labelled the "total impervious surface area map".

17. Removed

Delineation of IPZ-1

Rule 62.1 allows for the expansion of IPZ-1 delineation on land to a maximum of a 1km radius. This allows additional transport pathways to be captured.

Current Approach	IPZ-1 delineations on land are limited to 120m from the high water mark and/or the Limit of Regulated Area (LORA), whichever is greater
Objective of Amendment	Allow IPZ-1 to be expanded to capture transport pathways (e.g. ditches) and risks on the ground that were previously missed
Approved Amendment	Allows expansion of IPZ-1 to maximum of 1km radius around drinking water intake
Impact for TSR	Will need to evaluate whether the setbacks of IPZ-1s should be increased. If setbacks were increased, additional threats would be identified. • If applied with current V scores, some of the areas within the IPZ-2 (i.e. transport pathways adjacent to IPZ-1) might take on the slightly higher IPZ-1 score, but still not result in SDWTs. TSR is exploring the decision criteria for source and area V factors. If V scores increase, could have new SDWT's.
Enabling or Mandatory	Enabling. Will only be executed if Municipalities feel that it is necessary to capture risks affecting drinking water intakes R62.1 does not require revisiting all existing IPZ-1 delineations unless existing information indications the presence of surface water features that may increase the vulnerability of IPZ-1 to contaminations, subject to local authority discretion/professional judgment.

2017 Rule 61 and 62 (no change to these rules)

Rule 61 describes the methods for delineating IPZ-1's (i.e. 1km radius around intake) Rule 62 describes the methods for determining setbacks on land (i.e. 120m from High Water Mark and/or LORA, whichever is greater)
2021 Rule 62.1 (in addition to existing Rule 61 and 62) final approved version (no change from proposed version)
The setback delineated in accordance with rule (62) may be extended to other areas within the area delineated in accordance with rule 61, if applicable, which may contribute water to the intake

Vulnerability Scores in IPZ-2

The following proposed amendments allow for multiple vulnerability scores to be calculated for a single IPZ-2 to take into account the potential variation in the landscape over a large area.

Current Approach	IPZ-2 has a single vulnerability score
Objective of Amendment	Allow flexibility in vulnerability scoring. Potential to reduce implementation burden if scores are lowered in some areas of the IPZ-2
Approved Amendment	Amendments allow for multiple vulnerability scores in 'areas' of IPZ-2
Impact for TSR	Unknown at this time. If changes to the Table of Drinking Water Circumstances are mandatory, there could be a substantial increase in the number of threats in IPZ-2 that could warrant a re-evaluation of scoring using the amended Rules. Will require input from MECP • If applied to current V scores, we get sub-scores that are science-based. Does not result in SDWTs, but need to re-do ISA, ML, LD maps for each sub-area. TSR is exploring the decision criteria for source and area V factors. If V scores increase, could have new SDWT. • Mapping exercise – choice is ours If v scores change then policy changes likely
Enabling or Mandatory	Enabling. May be considered a necessary activity locally. Technical work may not be financially supported by MECP

Vulnerability Scores in IPZ-2 (continued)

2017 Rule 86
A vulnerability score shall be assigned to each IPZ-1 and IPZ-2 associated with a type A, B, C or D intake and to each area of an IPZ-3 associated with a type C or type D intake
2021 Rule 86 final approved version (no change from proposed version)
A vulnerability score shall be assigned to each IPZ-1 and **to each area of an IPZ-2** associated with a type A, B, C or D intake and to each area of an IPZ-3 associated with a type C or type D intake

2017 Rule 87
The vulnerability score assigned to each IPZ-1, IPZ-2 and each area of an IPZ-3 associated with a type C or type D intake shall be calculated in accordance with the following formula: B x C Where, B = the area vulnerability factor of the area of the surface water intake protection zone determined in accordance with rules 88 to 93; and C = the source vulnerability factor of the surface water intake determined in accordance with rules 94 to 96.
2021 Rule 87 final approved version (no change from proposed version)
The vulnerability score assigned to each IPZ-1, **each area of an** IPZ-2 and each area of an IPZ-3 associated with a type C or type D intake shall be calculated in accordance with the following formula: B x C, etc. Note: Does not require revisiting all existing IPZ-2 scores. This rule addressed situations where an IPZ-2 is very large. It allows to subdivide the area to account for differences in local characteristics such as slopes, and soils.

2017 Rule 89
An PZ-2 shall be assigned an area vulnerability factor that is not less than 7 and not more than 9 based on the vulnerability of the area where a higher factor corresponds to a higher vulnerability.43
2021 Rule 89 final approved version (no change from proposed version)
One or more area vulnerability factors that are not less than 7 and not greater than 9 shall be assigned **to each area within an IPZ-2** based on the vulnerability of the area where a higher factor corresponds to a higher vulnerability
2017 Rule 92
The following shall be considered and documented in determining the area vulnerability factor of

an IPZ-2 or an area within an IPZ-3 for the purpose of rule 89 or 90 and an explanation shall be provided on how each affected the determination of the area vulnerability factor of that area: 1. The percentage of the area of the IPZ-2 or IPZ-3, as the case may be, that is composed of land. 2. The land cover, soil type, permeability of the land and the slope of any setbacks. 3. The hydrological and hydrogeological conditions of the area where the transport pathway is located. 4. In respect of an IPZ-3, the proximity of the area of the IPZ-3 to the intake.
2021 Rule 92 final approved version (no change from proposed version)
The following shall be considered and documented in determining the area vulnerability factor of an **area within an** IPZ-2 or IPZ-3 for the purpose of rule 89 or 90 and an explanation shall be provided on how each affected the determination of the area vulnerability factor of that area: Etc.

Delineation of IPZ-ICA and WHPA-ICA

The term IPZ-ICA and WHPA-ICA is introduced in these amendments and replaces the former ICA (Issue Contributing Area). Previously, the delineation of and ICA was restricted to existing boundaries of vulnerable areas which could result in ICAs that were much larger, or smaller than necessary. This amended Rule would allow for delineation beyond the extent of vulnerable areas.

Current Approach	ICA delineation was previously restricted to the limits of other existing vulnerable areas (WHPAs or IPZs)
Objective of Amendment	Allow an Issue Contributing Area to be delineated where evidence shows that activities on the land contribute to an existing drinking water issue. This could be smaller or larger than existing vulnerable areas.
Approved Amendment	Broadens the definition of ICA
Impact for TSRSPA	**Woodstock's new ICA will be impacted to use new rules around supporting the size of a new ICA. This will also require mapping and wording changes in the UTR AR and SPP.**
Enabling or Mandatory	Mandatory for new IPZ-ICA and WHPA-ICA, but enabling for existing ICAs

2017 Rule
N/A
New 2021 Rule 78.1 final approved version (no change from proposed version)
78.1 Area IPZ-ICA, being the issue contributing area in relation to Part XI.1, shall only be delineated where, (1) a drinking water issue is identified in accordance with rule 114 in relation to the intake; and (2) there is evidence that activities, conditions that result from past activities, and naturally occurring conditions, within this area, contribute to the drinking water issue described in subrule(1).

2017 Rule 115(3)
area within a vulnerable area where activities, conditions that result from past activities, and naturally occurring conditions may contribute to the parameter or pathogen and this area shall be identified as the “issue contributing area”;
2021 Rule 115(3) final approved version (no change from proposed version)
The issue contributing area delineated in accordance with subrules 47 (7) or 48 (7) or rule 78.1

In addition, several calculations are required in the approved amendments for IPZ-ICA and WHPA - ICA, regardless of the issue for which it is delineated. These are - Rule 16 (9)(b) % managed land; Rule 16(10) livestock density, Rule 16(11) Impervious area lands (unless the vulnerability score is below the threshold for significant, moderate or low threats, but IPZ-ICAs won’t have vulnerability scores)

Activities Designated as Local Risk

R119 was amended to avoid duplication in efforts between provincial/Federal regulations. Activities beyond those prescribed under the regulations can be added to a local plan as a risk, with the Director's approval. Current rules are not specific about the type of activities that can be added as local threats. The approved amendments limit the addition of local drinking water threats to only those activities that are not currently regulated by the provincial or federal government. Where the province or federal government already regulate activities that may pose a risk to drinking water, there is no added benefit for SPP policies to duplicate this effort. However, the SPC/A can discuss with the ministry the value of adding a local risk to the Source Protection Plan.

Current Approach	Local threats could be identified as any activity posing a threat to drinking water regardless of other relevant legislation governing the activity
Objective of Amendment	Avoid duplication of provincial efforts.
Approved Amendment	Focus on recognizing local activities that require further management, not those that are already provincially or federally regulated.
Impact for TRS	None at this time.
Enabling or Mandatory	Mandatory for new local threats

2017 Rule 119
In addition to activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraphs 21 and 22 of subsection 1.1(1) of O Reg. 287/07 (General), an activity shall be listed as a drinking water threat for a vulnerable area if 1. The activity has been identified by the source protection committee as an activity that may be a drinking water threat; 2. Information provided by the Director indicates that, a) the chemical hazard rating of the activity is greater than 4; or b) the pathogen hazard rating of the activity is greater than 4.
2021 Rule 119 final approved version (no change from proposed version)
In addition to activities prescribed to be drinking water threats in paragraphs 1 through 18 and paragraphs 21 and 22 of subsection 1.1(1) of O Reg. 287/07 (General), an activity shall be listed as a drinking water threat for a vulnerable area if 1. The activity has been identified by the source protection committee as an activity that may be a

drinking water threat;

2. An approval is not required to engage in the activity pursuant to any Act (Provincial or Federal);

3. The Director has confirmed in writing that the activity is an activity that can be assessed and addressed as a drinking water threat under the Clean Water Act; and

4. Information provided by the Director indicates that,

a) the chemical hazard rating of the activity is greater than 4; or

b) the pathogen hazard rating of the activity is greater than 4.

Table of Drinking Water Threats

2022 Review

Some editorial changes have been made to the definitions and circumstances, these will need to be carefully reviewed when policy changes are considered. Based on a cursory review, there appear to be no changes from the proposed changes to the DTR to the areas where activities can now be considered a SDWT.

Plan of Action

- Conduct risk assessment for each potential drinking water threat to ensure that policies are up to date (spring to fall 2022)
- Update policies accordingly (fall to winter 2022)

Several changes have been made to the circumstances listed in the Table of Drinking Water Threats. These changes are proposed to align with existing definitions, use updated scientific information, and/or to provide clarity. Many of these will ultimately result in simple editorial changes to the policies in the TSRSPA Source Protection Plan that will improve implementation of the policies. However, several of the approved changes will require a reassessment of existing threats and could result in additional SDWTs (Table 1).

The following assessment only considers significant drinking water threats and the potential changes to policies that will be necessary. A full risk assessment would have to be completed to identify all significant, moderate and low threats, which would be included in the Assessment Report.

Provincial Instruments

Most of the changes to the table of drinking water circumstances will affect activities that are managed using various Provincial Instruments. The approved changes bring the drinking water circumstances in line with current Ministry approaches to improve implementation. The policies in the Thames-Sydenham Region Source Protection Plan would need to be updated to reflect these new circumstances, but the associated Ministry would be expected to identify any new and/or existing threats and manage them appropriately using a Provincial Instrument. It is not clear whether these changes to the circumstances will require a mandatory update to the SPP, however, it would increase administrative burden on the Ministry if intakes and wells use different versions of the Table of Drinking Water Threats.

Part IV of the Clean Water Act (policies implemented by RMO/I)

Some of the changes to the table of drinking water circumstances will affect activities that are managed or prohibited by policies that use Part IV of the *Clean Water Act*. These include the Handling and Storage of Fuel, Application and Storage of Road Salt, Storage of Snow, Application and storage of Processed Organic Waste, and Waste transfer/processing sites and Handling and Storage of DNAPLs. Of particular note, the storage of road salt is currently prohibited because the current circumstances were unlikely to occur. There is currently no policy for the application of road salt because the minimum circumstance of 80% impervious area was not met. These activities and the approach for ensuring that they cease to be, or never become a SDWT will need to be re-evaluated. These changes will require the

RMO/I to assess new or existing threats and will result in additional RMPs. The RMO/I is employed by UTRCA through an agreement with municipalities so this burden would ultimately be carried by municipalities. Similarly to Prescribed Instrument, it is not clear whether these changes to the circumstances will require a mandatory update to the SPP for existing drinking water intakes. While the changes would certainly result in more work for the RMO/I and would likely result in additional RMPs, it is important that all intakes and WHPAs are protected using the most current and best available science and that protection is consistently applied throughout the Region, and the Province.

Since new certain activities may no longer be significant drinking water threats under the 2021 Rules, local authorities and RMOs need to work together to consider how these changes may impact existing and future RMP holders. This includes identifying any existing RMPs that may need to be amended or revoked. RMOs do not need to wait for the plans and assessment reports to be amended before revoking or amending RMPs that are no longer required under the 2021 Rules. In addition, RMOs should not issue new RMPs for an activity that is no longer a significant drinking water threat under the 2021 Rules, even if it is identified as one in the current plan.

Note: RMOs cannot amend or establish RMPs for activities that become new significant threats because of the 2021 Rules until after the plan itself has been amended to align with the Rules, and it takes effect.

Table 1.

Threat	Sub-threat	Policy changes	New policies	Current Vulnerable Area	New Vulnerable Area	Potential New Threats	Current Policy tool
Road Salt	Application and Storage	Yes	Yes (application)	IPZ >9^{+}	IPZ >9^{+} WHPA 10	Yes	Prohibit (storage)
Snow	Storage	Yes	Yes	IPZ >9^{+}	IPZ >8^{++} WHPA ^{10}	Yes	RMPs
Fuel	Handling and Storage	Yes *		IPZ >9^{+}	IPZ >9^{+} WHPA 10	Yes	RMP, PI
Sewage	**Wastewater Collection^**	**Yes**	**Yes (sanitary sewers)**	**IPZ >8^{++}**	**IPZ >8^{++}**	**Yes**	**PI, Specify Action**
Sewage	**Wastewater treatment^**	**Yes**	**Yes**	**IPZ >8^{++}**	**IPZ >8^{++}**	**Yes**	**PI, Specify Action**
Sewage	**Storm water^**	**Yes**	**Yes**	**IPZ >8^{++}**	**IPZ >8^{++}**	**Yes**	**PI**
Sewage	**Industrial effluent^**	**Yes ***	**Yes**	**IPZ >8^{++}**	**IPZ >8^{++}**	**Yes**	**PI**
DNAPL	Handling and Storage	No	No	IPZ>9 WHPAs A-C	IPZ >9^{+} WHPAs A-C	Yes	RMPs E&O
NASM	Handling, storage and application	No	No	IPZ >8^{++}	IPZ >8^{++}	No	PI
Waste disposal	Waste transfer/processing sites	Yes	Yes (municipal waste)	IPZ >9^{+}	**IPZ >8^{++}**	Yes	PI, RMP

					WHPA – 10?		
Waste disposal	Processed Organic Waste	Yes *		IPZ >8[++]	IPZ >8[++]		PI, prohibit
Waste disposal	Hauled Sewage	Yes	Yes (storage)	IPZ >8[++]	IPZ >8[++] **WHPA – 10?**	Yes	PI

* Denotes that changes to policies should be editorial only

[+] Wallaceburg (IPZ's with score >9)

[++] LAWSS, Petrolia, Wallaceburg (IPZ's with score >8)

^ Revise policies for new terminology and circumstances. It is unclear whether this will create any changes to the number of drinking water threats in the TSR. However, these activities are primarily addressed through prescribed instrument policies and it is assumed that the appropriate provincial ministries will address any changes that may arise as a result of these circumstance changes.

Application and Storage of Road Salt

Circumstances apply to IPZ's with scores of 9-10 (Wallaceburg) and WHPAs -10s. Currently the storage of salt > 5000 tonnes is prohibited through s.57. There is no policy for road salt application because the minimum circumstance of 80% impervious area was not met in these areas. Imperviousness should be recalculated and it is likely that these areas would now meet the minimum circumstance of >8% impervious area in IPZ-1 and >30% for WHPA 10s. This will require a new policy (e.g. s.58 Risk Management Plan).

To identify the risk associated with this threat, two components are needed:

1) The thresholds for low, moderate, and significant risks and;
2) The grid/area size where the circumstances would apply

Current Approach	Thresholds considered too high to identify salt application a SDWT Covered storage never a SDWT
Objective of Amendment	Used an improved scientific method Old rules didn't account for many areas (parking lots, commercial plazas etc) storing smaller quantities of road salt.
Approved Amendment	Decrease thresholds for impervious areas to identify SDWT Reduce volume thresholds for storage Distinguish between covered and uncovered storage
Impact for TSRSPA	**Threats and policies will need to be reevaluated, new policies likely** **Number of threats will likely increase (additional RMPs)** **Impervious area should be recalculated** **SPC can choose to address these newly id'd areas using the same or different policy approaches/tools used to manage these threats sub-categories in their plan. Policies to manage significant drinking water threats related to road salt can use various tools, including RMPs, specify action, and E&O.**
Current polices in SPP	no policy for application because minimum threat circumstances weren't met (see Explanatory Document). Possible tools will be RMP, specify action, E&O

Current Circumstance	New Circumstance (changes from proposed version shown)	Areas of SDWT
The road salt is applied in an area where the percentage of total impervious surface area, as set out on a total impervious surface area map, **is 80 percent or more.**	The road salt is applied in an area where the **default percentage of impervious surface area is ~~>~~8% and 30% or more in WHPA-10s**	Wallaceburg WHPA – 10s(need to do mapping to see which areas are effected)
1. Where salt is stored in an area where it is impacted by precipitation or surface runoff 2. The quantity stored is **> 5000 tonnes**	1. The storage of road salt in a manner that the road salt is exposed to precipitation or runoff from precipitation or snow melt. 2. The quantity stored is **more than 20 kg.**	

Storage of Snow

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, Petrolia, LAWSS) and WHPA-10s. The new circumstances include thresholds where the storage of snow would be a SDWT in IPZs with scores greater than 8. For reference, 200m^2 is equivalent to 0.1 hockey rinks (13 parking spaces), 2000m^2 is equivalent to 1.25 hockey rinks (130 parking spaces), where the threshold was previously 10,000m^2 or 6.25 hockey rinks (650 parking spaces, or one city block). Storm water outfalls draining an area of snow storage is a new threat circumstance.

Current Approach	Does not acknowledge that snow storage and disposal may be regulated by an ECA under the *Ontario Water Resources Act (OWRA)*. Creates duplication if both ECA and RMP required
Objective of Amendment	Clarify circumstances covered by OWRA. Snowbanks or ploughed snow in residential areas are not included.
Approved Amendment	Use OWRA definitions, reduces volume limits substantially Enable SPA/SPC to add other activities with supporting evidence
Impact for TSRSPA	**Threats and policies will need to be reevaluated to include IPZ >8**

	Editorial change in policy to include IPZ>8 **Storage of Snow now considered a SDWT for IPZ with score >8, expands to LAWSS and Pertrolia** RMOs should investigate if a ECA exists for the site. If it doesn't the RMO may investigate further to determine whether the activity requires an RMP.
Current polices in SPP	RMPs

Current Circumstance	New Circumstance (changes from proposed version shown)	Areas of SDWT
The **snow is stored** at or above grade Total storage area is **>1 hectar**e (10,000m^2)	The **infiltration or discharge of snowmelt** from the storage of snow on a site where the predominant land use is commercial or industrial by any means other than a storm water drainage system outfall. The area upon which snow is stored >**200m^2** (IPZ with score >9) The area upon which snow is stored **>2000m^2** (IPZ with score >8)	Wallaceburg LAWSS Petrolia Wallaceburg
	A storm water drainage system outfall that serves a Snow Disposal Facility ~~or Snow Disposal Area~~ The area upon which snow is stored **>200m^2** (IPZ with score >9) The area upon which snow is stored **>2000m^2** (IPZ with score >8)	Wallaceburg LAWSS Petrolia Wallaceburg

The Handling and Storage of Fuel

Circumstances apply to IPZ's with scores of 9-10 (Wallaceburg) and WHPA-10s

Current Approach	Risks associated with the handling and storage of fuel are separate, despite the fact that they are associated with each other and often occur on the same property.
Objective of Amendment	Improve implementation of policies
Approved Amendment	Combine the handling and storage under one risk category Focused on permanent tanks/structures where fuel is stored.
Impact for TSRSPA	**Threat Assessments will be required** • Impacts TSR. • Revise policies for changed circumstances. **Although there are very few home heating oil tanks in the TSR, this change will likely add some new significant threats from agricultural and commercial fuel tanks that are between 250 and 2500 L.** Some threats reassessment will be required. Current TSR SPP policy requires RMP's for significant fuel threats. When updating plans, policies that used general language, such as 'policy applies where the threat is significant', would not require a change to adderss new threats due to the new thresholds. However, where existing policy wording specifies storage size, the policy would need to be revised. – TSR SPP is general, therefore no change to policy only to threat verification.
Current policies in SPP	Multiple

Current Circumstance	New Circumstance	Areas of SDWT
The **storage** of liquid fuel in a tank at, above or partially below grade The fuel is stored in a quantity that is more than 2,500 L	The storage of liquid fuel in a tank at, above or partially below The fuel is **stored or handled** in a quantity that is more than 2,500 L	Wallaceburg WHPA 10s

The **handling** of liquid fuel in a tank at, above or partially below grade The fuel is handled in a quantity that is more than 2,500 L		

The Handling and Storage of Dense Non-aqueous Liquids (DNAPLs)

Circumstances apply to IPZ's with scores of 9-10 (Wallaceburg) and WHPAs A-C. DNAPL policies have proven challenging to implement in other SPA/Rs. There are no volume limits included in the circumstances, which could lead to the need for several Risk Management Plans for small volumes of listed chemicals.

Current Approach	DNAPL activities were not defined, handling and storage were considered separate activities
Objective of Amendment	Address implementation challenges
Approved Amendment	Adopt the list of activities from O.Reg 153 (brownfields) Enable SPA/SPC to add other activities with supporting evidence
Impact for TSRSPA	Revise policies for changed circumstances • Impacts TSR. • Revise policies for changed circumstances. **These changes may require some review of activities and existing RMP's but I don't expect that this will significantly change the number of existing threats in the TSR.** The existing policy approaches for DNAPLs in the TSR SPP can likely stay the same.
Current policies in SPP	RMP, E& O

Current Circumstance	New Circumstance	Areas of SDWT
N/A	The engagement of an activity that may include, but not limited to, those provided in List 1 of Section 9 ~~11~~ of the Glossary of Terms in the Table of Drinking Water Threats.	Wallaceburg WHPAs A-C

	Storage of a DNAPL at, above or partially below grade.	

Handling and Storage of Non-agricultural Source Material

Circumstances apply to IPZ's with scores of 8-10 (LAWSS IPZ-1, Petrolia, Wallaceburg) and WHPA 10s. The language of the circumstances has been changed to reflect the use of NASM on agricultural land (managed by a Nutrient Management Plan administered by OMAFRA) to distinguish it from the use of NASM on non-agricultural land (managed by an Environment Compliance Approval administered by MECP; see Processed Organic Waste). There is no agricultural land in the vulnerable areas where the handling and storage of NASM would be a SDWT.

Current Approach	NASM categories are not explicitly mentioned
Objective of Amendment	Align with *Nutrient Management Act* definitions
Approved Amendment	Explicitly state NASM categories that pose risk to drinking water
Impact for TSRSPA	**Editorial changes to policies** Reduces burden by excluding benign categories of NASM Unlikely to be much impact in TSR as there are only a few NASM threats.
Current Policies in SPP	PI and RMPs. **Current policies for NASM will now fall under waste category for Processed Organic Waste because there is no agricultural land where NASM is a SDWT??**

Current Circumstance	New Circumstance
Where **non-agricultural source material** is stored at, above or partially below grade in a structure that is a permanent or temporary nutrient storage facility as defined under the Nutrient Management Act (O.Reg 267). The mass of nitrogen in the non-agricultural source material stored is more than 5 tonnes.	The **material from non-farm herbivorous animals (Category 1), Category 2 or Category 3 non-agricultural source material** is stored at or above grade in or on a permanent or a temporary nutrient storage facility. The mass of nitrogen in the non-agricultural source material stored is more than 5 tonnes.

Non-agricultural source material is applied to land and may result in a release to groundwater or surface water In a vulnerable area where % of Managed Land >80% and Livestock Density >1.0 nutrient units/acre.	The **material from non-farm herbivorous animals (Category 1), Category 2 or Category 3 non-agricultural source material** is applied to land located in a vulnerable area In a vulnerable area where % of Managed Land >80% and Livestock Density >1.0 nutrient units/acre.
The **application of any quantity of non-agricultural source material** that contains materials from a meat plant or sewage works. The application may result in the presence of one or more pathogens in groundwater or surface water.	The **land application of any quantity of Category 3 non-agricultural source material other than Category B compost** and that contains material from a meat plant or sewage biosolids, **or material from non-farm herbivorous animals (Category 1).** The application may result in the presence of one or more pathogens in groundwater or surface water.

The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage

Sub-threat: **Wastewater collection facilities and associated parts**

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia) and WHPAs -10s

Current Approach	Does not clearly identify the different types of storm water and wastewater works that may contribute contaminants to drinking water sources
Objective of Amendment	Better align with how these works are regulated under Environmental Compliance Approvals (ECAs).
Approved Amendment	New Subthreat 'Wastewater Collection Facilities and Associated Parts'; previously CSO discharge & sanitary sewers and related pipes Use the definitions of storm water in the *Ontario Water Resources Act* (OWRA) for consistency.
Impact for TSRSPA	**Threats and policies will need to be reevaluated**

	Potential for additional threats, but manage with PI policies • Impacts TSR. • Revise policies for new terminology and circumstances. • It is unclear whether this will create any changes to the number of drinking water threats in the TSR. However, these activities are primarily addressed through prescribed instrument policies and it is assumed that the appropriate provincial ministries will address any changes that may arise as a result of these circumstance changes.
Current polices in SPP	PI and Specify Action

Current Circumstance	New Circumstance
The system is a **combined sewer** that, when overflows, **may discharge to surface water** From Sewage Treatment Plants that discharge treated effluent **17,500 - 50,000 m^3/d** (IPZ 9) or **>50,000 m^3/d** (IPZ 8)	A **combined sewer or partially separated sanitary sewer** outfall that discharges combined sewer overflow, or the s**anitary sewer overflow from a manhole or wet well** that forms part of a wastewater collection facility and may discharge **to land or** surface water. The wastewater collection facility is designed to convey more than **10,000 – 100,000m^3/d** (IPZ 9) or **>100,000 m^3/d** (IPZ 8) of sewage
The system is a **combined sewer** that may discharge sanitary sewage containing human waste to surface water. The discharge may result in the presence of one or more pathogens in surface water.	A **combined sewer or partially separated sanitary sewer** outfall that discharges combined sewer overflow, **or the sanitary sewer overflow from a manhole or wet well** that forms part of a wastewater collection facility and may discharge **to land** or surface water. (IPZ 8 and 9) **A wet well, a holding tank or a tunnel that forms part of a wastewater collection facility, and stores sanitary sewage containing human waste.** (IPZ 9) The discharge may result in the presence of one or more pathogens in surface water.

Sub-threat: **Wastewater treatment facilities and associated parts**

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia) and WHPA 10s. These policies would need to be reevaluated under the new circumstances.

Current Approach	Does not capture all potential risks
Objective of Amendment	Better align with how these works are regulated under Environmental Compliance Approvals (ECAs).
Approved Amendment	Use the definitions of storm water and wastewater works in the *Ontario Water Resources Act* (OWRA)for consistency. Add holding tanks and lagoons as SDWT
Impact for TSRSPA	**Threats and policies will need to be reevaluated** Potential for additional threats, but manage with PI policies • Impacts TSR. • Revise policies for new terminology and circumstances. • It is unclear whether this will create any changes to the number of drinking water threats in the TSR. However, these activities are primarily addressed through prescribed instrument policies and it is assumed that the appropriate provincial ministries will address any changes that may arise as a result of these circumstance changes.
Current polices in SPP	PI, Specify Action

Current Circumstance	New Circumstance
A sewage treatment plant effluent discharge, by way of a designed bypass *or* through means other than designed bypass. Plant is subject to the OWRA and requires a CofA Discharge of treated effluent >17,500 m^3/d (IPZ with score greater than 9) Discharge of treated effluent >50,000 m^3/d (IPZ with score greater than 8)	A final effluent outfall or a sewage treatment plant overflow outfall that is part of a wastewater treatment facility. Discharge of treated sanitary sewage 17,500 - 50,000 m^3/d (IPZ with score greater than 9) Discharge of treated sanitary sewage >50,000 m^3/d (IPZ with score greater than 8)
The system is a wastewater treatment facility that discharges to surface water by way of a designed bypass *or* through means other than designed bypass.	**A final effluent outfall or a sewage treatment plant overflow outfall that is part of a wastewater treatment facility.** A discharge may result in the presence of one or

A discharge may result in the presence of one or more pathogens in groundwater or surface water.	more pathogens in surface water. (IPZ with score greater than 8)
The system is a sewage treatment tank, or a sewage treatment tank in either a wasterwater collection or treatment facility at or above grade. A spill from the tank may result in the presence of pathogen(s)	A sewage treatment plant process tank or a sewage treatment plant **holding tank**, or a **sewage lagoon** that does not discharge to surface water, and that forms part of a wastewater treatment facility. A spill may result in the presence of one or more pathogens in groundwater or surface water. (IPZ with score greater than 9)

Sub-threat: **Storm Water Management Facilities and Drainage System**

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia) and WHPA 10s. This activity is currently managed with a PI policy, which would need to be reevaluated under the new circumstances. Impervious area will need to be re-calculated.

Current Approach	Does not clearly identify different types of storm water that may contribute contaminants to drinking water
Objective of Amendment	Provide clarity -identify risks for SW and GW sources separately and in alignment with the OWRA.
Approved Amendment	Aligns with Ministry approach
Impact for TSRSPA	Threats and policies will need to be reevaluated Potential for additional threats, but manage with PI policies • Impacts TSR. • Revise policies for new terminology and circumstances. • It is unclear whether this will create any changes to the number of drinking water threats in the TSR. However, these activities are primarily addressed through prescribed instrument policies and it is assumed that the appropriate provincial ministries will address any changes that may arise as a result of these circumstance changes.
Current polices in SPP	PI

Current Circumstance	New Circumstance	Areas of SDWT

A storm water management facility designed to discharge storm water to groundwater (through infiltration) or surface water where: The **drainage area is >100 ha** and the **predominant land use is rural, agricultural, or low density residential**	A storm water management facility outfall or a storm water drainage system outfall that serves land where the **predominant land use is rural, agricultural, outdoor recreational, parkland or greenhouse, ~~excluding greenhouses~~.** The **impervious areas** of the lands served by the facility* or to the storm water drainage system is **>50%** of the drainage area.	
A storm water management facility designed to discharge storm water to groundwater (through infiltration) or surface water where: The **drainage area is >100 ha** and the **predominant land use is high density residential**	A storm water management facility outfall or a storm water drainage system outfall that serves land where the **predominant land use is residential or institutional or community use.** The **impervious areas** of the lands served by the facility* or to the storm water drainage system is **>20%** of the drainage area.	
A storm water management facility designed to discharge storm water to groundwater (through infiltration) or surface water where: The **drainage area is >10 ha** and the **predominant land use is Industrial/Commercial**	A storm water management facility outfall or a storm water drainage system outfall that serves land where the **predominant land use is commercial or industrial land uses ~~including greenhouses~~ where** The **impervious areas** of the lands served by the facility* or to the storm water drainage system is **>20%** of the drainage area (IPZ with score higher than 9) or **> 50%** of the drainage (IPZ with score higher than 8)	
1. The system is a storm water management facility designed to discharge storm water to land or surface water. 2. The drainage area associated with the storm water management facility is more than 100 hectares and the predominant land uses in the area are industrial or commercial.	1. A storm water infiltration facility that serves land where the predominant land use is commercial or industrial land uses including greenhouses. 2. The sum of impervious areas of the lands served by the facility (including roads, sidewalks and parking surfaces - aisles and driveways but excluding roofs) draining to the storm water infiltration facilities in the site is more than 2000 m2.	

* The impervious areas of the lands served by the facility draining to the storm water management facility includes roads, sidewalks and parking surfaces - aisles and driveways but excludes roofs

Subthreat: **Industrial effluent discharge**

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia) and WHPA 10s?. Policies to mitigate these risks use Provincial Instruments. Some new SDWTs are possible, but these will be managed by an existing PI.

Current Approach	Does not capture all potential risks
Objective of Amendment	Capture all risks
Approved Amendment	Include risk of discharge to land and threat to groundwater
Impact for TSRSPA	**Editorial changes to policies** Some additional SDWTs possible, but managed by PI • Impacts TSR. • Revise policies for the new circumstance of discharge to land. TBD: impacts on numbers of SDWTs.
Current Policies in SPP	PI

Current Circumstance	New Circumstance	Areas of SDWT
Industrial Effluent is discharged to surface water Discharger is a facility required to report through Environment Canada's National Pollutant Release Inventory (NPRI) for the parameter	A **wastewater system that discharges to surface water or land and has as its primary function the collection, transmission or treatment of industrial sewage.** The system is part of a facility for which the NPRI Notice requires a person to report and the report must include information in relation to specific parameters	

The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.

Sub-threat: **Waste transfer/processing sites**

New circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia) and WHPas?. Policies to mitigate these risks use Provincial Instruments. Some new SDWTs are possible, but these will be managed by an existing PI. RMPs are used for site that are not subject to Environmental Compliance Approval (none established to date)

Current Approach	Did not capture municipal waste explicitly
Objective of Amendment	Align with Ministry's approach
Approved Amendment	Two sub-categories: Hazardous and Liquid Industrial Waste; Municipal Waste
Impact for TSRSPA	No change in vulnerable areas where activity is a SDWT **Editorial changes to policies to include municipal waste** **New policy for municipal waste** **Hazardous waste now considered a SDWT for IPZ with score >8, expands to LAWSS and Petrolia** Some additional SDWTs possible, but managed by PI We need to know which of the proposed sub-threats corresponds to which of the current sub-threats. With these new sub-threats, will we be missing any of the sub-threats we currently have and are managing/ prohibiting? New?
Current policies in SPP	PI, RMP, Specify Action

Current Circumstance	New Circumstance	Areas of SDWT
Storage of **hazardous waste or liquid industrial waste** at, above, or partially below grade at waste disposal sites.	The **municipal waste** is stored at, above or partially below grade at a transfer/processing site approved to receive only **municipal waste**	,

	The **hazardous waste or liquid industrial waste** is stored above, partially below or below grade at a transfer/processing site approved to receive **hazardous waste or liquid industrial waste**.	

Sub-threat: **Application and storage of Processed Organic Waste**

Circumstances apply to IPZ's with scores of 8-10 (Wallacebury, LAWSS, Petrolia) and WHPA 10s. Policies to mitigate these risks use Provincial Instruments. Some new SDWTs are possible, but these will be managed by an existing PI. Processed Organic Waste (POW) is sewage biosolid (which is categorized as NASM 3). It is considered POW when applied or stored at a *non-agricultural* site.

Current Approach	Uses NASM threat circumstances
Objective of Amendment	Clarify the intent of the risk of POW as *waste*
Approved Amendment	Explicitly state POW as a risk
Impact for TSRSPA	No change in vulnerable areas where activity is a SDWT **Editorial changes to policies to include municipal waste** **New policy for municipal waste**
Current polices in SPP	2.23, 2,24, 2.25

Current Circumstance	New Circumstance	Areas of SDWT
Non-agricultural source material is applied to land **and may result in a release** to groundwater or surface water In a vulnerable area where: - % Managed Land is 4-80% and Livestock Density is >1 NU/acre - % Managed Land is >80% and Livestock Density is >0.5 NU/acre	**The processed organic waste ~~or waste biomass~~** is applied to a land located in a vulnerable area In a vulnerable area where: - % Managed Land is 4-80% and Livestock Density is >1 NU/acre - % Managed Land is >80% and Livestock Density is >0.5 NU/acre or >1.0 NU/acre	
The application of any quantity of **non-agricultural source material that contains**	Land application of any quantity of **processed organic waste ~~or waste~~**	

materials from a meat plant or sewage works. The application may result in the presence of one or more pathogens in groundwater or surface water.	~~**biomass.**~~ The application may result in the presence of one or more pathogens in groundwater or surface water.	
Non-agricultural source material is stored at, above or partially below grade The mass of nitrogen in the processed organic waste stored is more than 5 tonnes.	**The processed organic waste or waste biomass** is stored at, above or partially below grade. The mass of nitrogen in the processed organic waste stored is more than 5 tonnes.	
The **non-agricultural source material contains material generated by a meat plant**, and any portion of the material is stored at or above grade. A spill of the material or runoff from an area where the material is stored may result in the presence of one or more pathogens in groundwater or surface water.	The **processed organic waste or waste biomass** is stored on a site, and any portion of the material is stored at or above grade. The storage may result in the presence of one or more pathogens in groundwater or surface water.	

Sub-threat: **Hauled Sewage**

Circumstances apply to IPZ's with scores of 8-10 (Wallaceburg, LAWSS, Petrolia). Policies to mitigate these risks use Provincial Instruments. Some new SDWTs are possible, but these will be managed by an existing PI.

Current Approach	Language didn't adequately distinguish the activity as 'waste' Storage wasn't captured
Objective of Amendment	Adequately capture the risks to source water
Approved Amendment	Use the term 'disposal' Add storage as a SDWT Storage of hauled sewage (threat #1.8): Table did not capture the risk associated with the stationary storage where the hauled sewage is stored temporarily by haulers where it is not generated or disposed. Therefore, a SPA should consider updating the policies in a SPP where

	needed to reflect these new sub-categories at the time of next amendments.
Impact for TSRSPA	Potentially updating policy
Current polices in SPP	?

Current Circumstance	New Circumstance	Areas of SDWT
Hauled sewage is applied to land and may result in a release to groundwater or surface water Total application area > 10 hectares.	The **disposal of hauled sewage to land by any method**. The application area >10 hectares. (chemical)	
Land application of hauled sewage in any quantity. **The application** may result in the presence of one or more pathogens in groundwater or surface water.	**Land disposal of** hauled sewage in any quantity. **The disposal** may result in the presence of one or more pathogens in groundwater or surface water. (pathogen)	
N/A	The hauled sewage is stored in a lagoon at a site in a stationary means of containment for hauled sewage, not including a site where it is produced before its collection by a hauled sewage system. (chemical)	
N/A	The hauled sewage is stored in a tank or in a lagoon on site in a stationary means of containment for hauled sewage. (pathogen)	

Mandatory Changes to the SPP and AR – 2021 Rules

Type of Change	SPP	AR	Expl. Doc
Editorial	WHPA ICA (replace WHPA-F)	Wording – WHPA – ICA (UT) (Replace WHPA-F)	
Policy	Application of Road Salt		Justification for approach taken
Justification		Changes to how to calculate ISA	Changes to how to calculate ISA
Editorial	2.35 Snow storage to include IPZ-8		
Editorial	Wastewater sub-categories– update for circumstances and terminology		
Editorial	DNAPs – include IPZ 9 &10		
Editorial	NASMs – editorial changes		
Editorial/Policy	Waste Transfer - **Editorial changes to policies to include municipal waste** **New policy for municipal waste**		
Editorial	POW - **Editorial changes to policies to include municipal waste** **New policy for municipal waste**		
Editorial	Hauled Storage		
Editorial		Liquid Hydrocarbon by a pipeline – Change name	

		from National Energy Board Act to Canadian Energy Regulator	
Editorial		Climate Change verbiage?	

Follow the **COVID-19 restrictions and public health measures** and **book your appointment to get vaccinated**.

Ontario

Best practices for source water protection

Learn how to manage risks and identify actions that you can take to protect your drinking water source.

Take our survey to share your feedback on our best practices to protect sources of drinking water.

Get started

We want to help you protect water sources and drinking water systems that are not included in a source protection plan or aren't regulated by the *Clean Water Act*.

Protecting sources of drinking water is one part of Ontario's strategy to ensure drinking water safety, sustainable water use and water security for future generations. You can tailor an approach that works for you.

By proactively protecting drinking water sources you:

- protect human health and the environment
- avoid the high costs of either cleaning up a contaminated drinking water source or having to find a new source of drinking water
- reduce the cost of water treatment for some contaminants
- extend the life of your system's infrastructure
- make informed land use planning decisions
- increase public awareness and accountability of drinking water stewardship

Decide if you need to take action

Drinking water can come from surface water (an intake pipe or a shore well that draws water from a lake or river) and groundwater (a drilled or dug well) sources.

Certain activities can pose a risk to drinking water if pollutants are released to the environment. Pollutants, also called contaminants, are either:

- **chemicals**, such as fuels, solvents, metals and pesticides
- **biological pathogens,** such as bacteria and viruses

Soil can sometimes act as a natural filter for pathogens so some private well owners do not treat the water in their wells. But groundwater can become contaminated when chemicals or pathogens are released on or into the ground from human activity.

Example: Bacteria in private wells can come from on-site sewage systems and fuel can leak from heating oil tanks. Your well can become contaminated if these contaminants move through the soil into the groundwater.

Surface water bodies have no natural filter for contaminants like pathogens. Surface water can become contaminated when:

- chemicals or pathogens are released directly into surface water bodies
- surface water run off carries contaminants across land that drains into surface water bodies

As a result, surface water always needs some form of treatment before it is safe to drink.

Source protection adds another layer of protection by managing activities that may pose a risk before they become a problem.

If your drinking water source is not currently included in a provincially approved source protection plan, you may want to consider whether actions are needed to protect your drinking water source. You can learn more about how to identify areas where drinking water sources could be at risk and how to manage risks to drinking water sources.

Two things you'll want to consider:

- if your drinking water source is vulnerable to contamination
- if other risk factors exist

Vulnerable drinking water sources

Some drinking water sources are more vulnerable to contamination than others, which means that you may need to take stronger action to protect them. Generally, the more vulnerable your source is, the more important it is to take action to protect the source.

Protecting the ground surface above vulnerable groundwater from potential contaminants will improve the protection of groundwater sources at deeper depths. Similarly, protecting the land that drains into surface water bodies from potential contaminants will improve the protection of the surface water source. If you determine your drinking water source is vulnerable to contamination, you may decide to take action to protect it.

The vulnerability of a drinking water source is based on the characteristics of the natural environment.

For groundwater sources, these characteristics include the type of soil and rock in the area and how quickly water (and contaminants) can travel through it.

For surface water sources, these characteristics include the type of source (lake or river), water flow and wind conditions, rainfall, the slope of the land, presence of vegetated or paved surfaces, and the soil type.

To help figure out how vulnerable your drinking water source is, you can look at:

- Highly Vulnerable Aquifer mapping
- your local setting
- preferential pathways
- other resources
- hiring a professional

Highly Vulnerable Aquifers

Your aquifer is the layer of soil where your well gets its groundwater. Some aquifers are more vulnerable to contamination than others.

Municipal groundwater studies and source water protection studies have been completed across much of Ontario. Highly Vulnerable Aquifers were delineated as part of the technical work in support of the development of source protection plans under the *Clean Water Act*. They are aquifers that can easily be contaminated because overlying soil layers are thin or permeable. They may or may not represent drinking water sources. Local source protection assessment reports will provide more information about how local Highly Vulnerable Aquifers were delineated and which aquifers are presented in the Highly Vulnerable Aquifer mapping. You can view Highly Vulnerable Aquifer mapping on the Source Protection Information Atlas. These maps can tell you where you may want to take action to protect your drinking water source.

Assess your local setting

Your local setting can tell you about the vulnerability of your drinking water source.

Groundwater sources

Take a look at the type of soil you have and how well the soil transmits water, also called the permeability of the soil. This relates to how quickly contaminants can reach your well from where they may have been released to the environment.

Soil is made up of particles of rock that can vary in size. The particles of rock that make up sand and gravel soil are larger than the particles of rock that make up silt and clay soil. Larger particles don't pack together as well as small particles so there is more space between sand and gravel particles than silt and clay particles. Groundwater travels faster through sand and gravel than through silt and clay because there is more space between the larger soil particles to allow water to flow.

Look at infiltration for a very basic way to assess whether your surface soil is permeable. When it rains, does water pond on your property or absorb quickly into the ground? The answer can give you a sense of the type of soil in your area and how vulnerable your groundwater source may be.

Soil thickness can also help you determine how vulnerable your groundwater is. If you can see rock outcrops on your property or can't dig very far before you hit rock, you have thin soil layers, which are usually more vulnerable than thicker layers.

You can get a rough idea of the vulnerability of your groundwater source as shown in the table below.

Local setting	**Vulnerability**
Highly permeable surface sand and gravel, loose, mixed soil types over bedrock or shallow, fractured bedrock	High
Lower permeable surface silt and clay or where impermeable soil is both above and below the aquifer as shown in your well log or geological maps	Low

Surface water sources

You can look at the movement and circulation of the water in your lake, river or stream to assess the vulnerability of surface water sources. Gravity and wind action also both contribute to the movement and circulation of surface water bodies. For streams and rivers, the steeper the slope of the land, the faster the water moves downstream. Strong wind action can circulate water in a pond or lake.

You can get a rough idea of the vulnerability of your surface water source as shown in the table below.

Local setting	**Vulnerability**

Local setting	Vulnerability
Slower moving water with less water circulation or mixing	High
Faster moving water with more water circulation or mixing	Low

Other factors affecting vulnerability

Preferential pathways, also called transport pathways, are human-made shortcuts that allow water to get to a drinking water source faster than under natural conditions. They can include things such as:

- improperly constructed or abandoned wells
- tile drains
- pits and quarries
- other excavations such as trenches for utilities and sewers

If you know these features are present, they can add to the vulnerability of your groundwater and/or surface water sources.

Preferential water flow also occurs through natural fractures in the soil and bedrock. These also impact vulnerability, especially when there is little soil overlying the bedrock.

Vulnerability resources

Learning about the physical characteristics of your area can help with your assessment of vulnerability. These maps and resources provide information about soil types, aquifers and the steepness of the land. Through the Ministry of the Environment, Conservation and Parks, the Ministry of Natural Resources and Forestry and the Ministry of Energy, Northern Development and Mines' OGSEarth website you can access:

- water well records and other borehole records
- quaternary geology and bedrock geology maps
- aquifer maps
- depth to water table maps
- maps of the thickness of the soil layers above aquifers
- geological cross-sections
- topographic surface and surface water feature maps (topographic maps show the locations of hills, mountains and valleys using lines, called contour lines, to represent different elevations)

If you are located within a source protection area, the watershed characterization and assessment report within the local source protection plan are also good resources to learn more about vulnerability.

Hire a professional

You may need to do some further assessment work to determine how vulnerable your source is to contamination if you need more information than the simple techniques presented above. A basic hydrogeological assessment or advanced modelling techniques can be used to determine the vulnerability of your drinking water source. Hydrogeology, or the study of water underground, is an area of geoscience. Geoscience is a regulated profession in Ontario under the Professional Geoscientists Act. Hire a Professional Geoscientist or Professional Engineer who is qualified to conduct hydrogeological assessments to do this work for you.

Professionals can be found through local listings in your area. You can also view public registers of Professional Geoscientists on the Professional Geoscientists Ontario website and Professional Engineers on the Professional Engineers Ontario website.

Consider a risk-based approach

There may be other factors beyond vulnerability that are important for you to consider. A risk-based approach can help you decide whether it's a priority for you to take action to protect your drinking water source. Municipalities and various communities may want to consider using this approach where information and resources are available.

The general concept of risk is the product of how likely something is to happen and how severe it would be if it happened. Risk is subjective, and your assessment of it may vary depending on your tolerance or comfort with accepting risk. Some level of risk is generally acceptable; however, it's a value judgement often based on local circumstances. The risk of a drinking water source being contaminated or depleted can be determined by looking at risk factors.

Assess your risk factors

Think about your local situation and using the provided table, ask yourself some general questions to rank (low, moderate or high) how 'at risk' your drinking water source may be. High risk sources may warrant action to protect the source.

There is no right or wrong way to assess risk and no one factor is more (or less) important than another.

> **Example**: Just because there are many wells in an area, doesn't necessarily mean those wells are at risk.

You can look at many factors together to assess the overall risk and look at the importance of each risk question compared to each other. This relationship should be based on local knowledge and the reliability of the data you used to rank the risk. Assigning importance or weighting to each risk question can help determine an overall risk ranking.

> **Example:** Confirmed water quality issues may be the driving factor where the system serves fewer users, whereas a system that serves many people where there are no known issues may still be at risk and require further protective actions.

You may also want to look at specific activities to determine the risk ranking.

> **Example:** Residential septic systems may be a nearby activity that could pose a risk to the drinking water source. If these systems are not properly maintained, they may pose a higher risk due to potential contaminants being able to get into drinking water sources, even though residential activities are generally considered lower risk than commercial or industrial activities.

Risk questions	Low risk	Moderate risk	High risk
How many wells or intakes are located in your area?	A few	Some	Many
How deep are the wells and are they drilled or dug?	Deep, drilled	Intermediate	Shallow, dug

Risk questions	Low risk	Moderate risk	High risk
How deep is the intake and how far is it located from shore?	Deep, far	Intermediate	Shallow, nearshore
What is the vulnerability of your area?	Low vulnerability setting	Moderate vulnerability setting	High vulnerability setting
How sensitive is the population?	Healthy adults only	Typical family or mixed range of ages	Vulnerable populations like the elderly, youth or infants
How many people does the system serve?	A few	Some	Many
How often is the system used?	Occasional	Seasonal or part time (work hours)	Every day or only source
What types of activities are located nearby?	Residential	Agricultural	Industrial or commercial
Do you have water quality issues? For example, algal booms or a boil water advisory.	Confirmed none	Possible / unknown	Confirmed present
Are you located in an area where there is pressure for growth? Or are there other water supply and demand issues?	No	Maybe / unknown	Yes
Is there oversight of the well(s) or intake(s)? For example, licencing, inspections, testing, compliance, and qualified operators.	Yes	Some	None

Risk resources

The following data sources can help inform your risk factors and assessment of risk.

- Property/lot fabric can give you a sense of how many people are located in your area based on township lot mapping but note that many vacant lots may be present in rural areas, which won't be a good indicator of population density.
- Development/building approval records, land use and zoning maps, official plans from your local municipality can help you determine the types of land use in your area.
- Water Well Information System records can help with the assessment of the number and construction details of wells in your area.
- Permit to Take Water records can be used to assess how much water is approved for use by permit holders (actual amounts used may be less).
- Environmental Compliance Approval records through Access Environment can provide information on activities in your area that are regulated by the Ministry of the Environment, Conservation and Parks.
- Vulnerability mapping from the Source Protection Information Atlas can give you vulnerability scores for locations within established source protection areas.
- For information on water quality, drinking water quality and enforcement records, local health department records on water quality, hydrological/hydrogeological studies conducted by municipalities, conservation authorities or consultants, and available monitoring data from the Provincial Groundwater Monitoring Network or surface water monitoring stations can be accessed.

For municipalities

You can assess risk on a broader regional scale where multiple drinking water systems are present. For multiple systems, you can use risk factors to create a list of risk rankings for each system. Comparing risk rankings in a list may be useful to prioritize and justify deciding which systems need further actions to protect the source.

You can also consider the potential for future risk associated with potential future development.

Regardless of the assessment of vulnerability or risk, you may decide that further action is needed to protect the source.

> **Example**: Even if a drinking water source is assessed to have low vulnerability and low risk based on current land uses, you can require technical work (or financial assurance to conduct such work) as a condition of development approvals with communal drinking water systems should the system become your responsibility in the future. You can learn more about managing risks to drinking water sources.

Work together

Protecting sources of drinking water is a shared responsibility. Think about your local situation and ask yourself "Is there a willingness in my community to protect the area around our wells or intakes?" Community/private drinking water may be from a shared source, and taking action in some circumstances might prove to be controversial.

> **Example**: To manage risks from private septic systems, a septic inspection program could be implemented; however, this could impact property owners who have to pay for the cost of the inspections. Collaborating with neighbours at a larger scale can be even more effective than at a smaller/private property scale.

Setting up community meetings or social media platforms to discuss issues are some ways to engage various participants. Remember to include and be respectful of differing opinions and priorities. Various resources are available online to help with building partnerships and conflict resolution.

Coordination of actions to protect drinking water sources between different jurisdictions can also improve protection of drinking water sources. Many partnerships have already been established through implementation of source protection planning in Ontario under the *Clean Water Act*. Local expertise can help with implementation of the actions you want to take to protect your drinking water source. You can connect with the following groups to find out more:

- municipalities
- Conservation Ontario
- conservation authorities
- source protection authorities and committees
- Risk Management Officials
- Indigenous communities and organizations
- environmental emergency response personnel
- small businesses
- agricultural operations
- local and neighbouring watershed experts
- environmental groups
- other community partners

In addition, collaborating with others may yield information and data that you may otherwise not be aware of or have access to. Using existing source protection information along with other information sources can help inform local decisions and actions at all levels from individual to communal systems. The following resources can help you do this:

- Source Protection Information Atlas
- Threats Tool
- Risk Management Measures Catalogue
- water quantity maps, or water budgets (now in the Source Protection Information Atlas)
- hydrogeological and hydrological studies (visit your local conservation authority website for these or Conservation Ontario for links to assessment reports and source protection plans)

Having a clear project plan and collaborating with your community can ensure your actions to protect your drinking water source are successful.

Next steps

If you decide that you need to take action to protect your drinking water source, you can learn more about identifying areas where drinking water sources could be at risk, managing risks to drinking water sources, reviewing and evaluating your actions, and exploring your options to include your drinking water source in a source protection plan under the *Clean Water Act*.

If you decide that you do not need to take action, you may still want to consider some best practices to protect the environment, such as spill prevention measures, septic system inspections or outreach and education on proper well maintenance and annual fuel tank inspections. You can find resources in the manage risks to drinking water sources page.

Identify areas where drinking water sources could be at risk

Take our survey to share your feedback on our best practices to protect sources of drinking water.

Overview

Drinking water protection zones are areas of land where drinking water sources could be at risk of contamination from certain activities. This is the area where your management efforts should be focused to protect your source. You can create a protection zone by using:

- land use information
- information about the vulnerability of your area
- a scientific method to create protection zones around your drinking water well or intake

If you are thinking about establishing a new municipal residential drinking water system within a source protection area or adding new wells or intakes to an existing municipal residential drinking water system within a source protection area, there are rules under the *Clean Water Act* for creating protection zones. Use the Source Protection Information Atlas to find out if you are located in an established source protection area.

It's important to know the specific areas of land where certain activities may pose a risk to your drinking water source. You can also learn more about the different approaches to manage these activities.

Use land use information

Drinking water sources can be contaminated by nearby activities that are associated with various land uses. You can look at current and future land use to determine which areas you need to protect and base the protection zone on property lines (lots and concessions or parcels of land). You can use this approach when you have information about land use activities that may pose a risk to your drinking water source. It is a cost effective and easy way to identify a protection zone with minimal effort. However, its limited scientific basis could lead to overprotecting some areas or not protecting others.

For municipalities and planning authorities

Where there is little or no development around your well or intake, you may want to designate that area for protection and direct some or all development to other areas.

Where there is an activity near your well or intake that is causing or could cause a problem with your drinking water, you may want to focus protective action in those areas where the activities are occurring.

You can also protect shared drinking water sources.

> **Example**: If all the wells in a hamlet draw water from the same source, you can designate a block or combined lots where certain activities would be managed or restricted.

Use vulnerable area information

Vulnerability is a way to describe how easily a drinking water source could be contaminated by nearby activities. The vulnerability of a drinking water source is based on the natural characteristics of the environment that determine how easily contaminants move. For groundwater sources, these characteristics include the type of soil and rock in the area and how quickly water can travel through it. For surface water sources, these characteristics include the type of source (lake or river), water flow and wind conditions, rainfall, the slope of the land, presence of vegetated or paved surfaces, and the soil type.

A vulnerable area under the *Clean Water Act* is a protection zone where activities that may pose a risk to drinking water are managed or restricted. Vulnerability assessments were conducted as part of the technical work in support of the development of source protection plans under the *Clean Water Act*. Vulnerable areas are assigned a number score (2 to 10) that indicates how vulnerable (i.e., sensitive) the drinking water source is to contamination. Generally, the higher the assigned vulnerability score within a vulnerable area, the more vulnerable the drinking water source. The Source Protection Information Atlas displays vulnerability scoring and has links to local source protection plans to help you learn more about the policies that affect activities and land use planning decisions in vulnerable areas.

Highly Vulnerable Aquifers

If you are located in an established source protection area under the *Clean Water Act*, you can view Highly Vulnerable Aquifer mapping for your area in the Source Protection Information Atlas. You may also be able to see aquifer mapping for areas outside source protection areas as a result of municipal groundwater studies.

Highly Vulnerable Aquifers are aquifers that can easily be contaminated because overlying soil layers are thin or permeable. They may or may not represent drinking water sources. Local source protection assessment reports will provide more information about how local Highly Vulnerable Aquifers were delineated and which aquifers are presented in the Highly Vulnerable Aquifer mapping. Highly Vulnerable Aquifer mapping and scoring helps delineate other vulnerable areas where source protection plan policies may apply.

Highly Vulnerable Aquifer mapping can help you create a protection zone where you can take action to protect your drinking water source.

Use a scientific method

Protection zones can be created around a drinking water well or intake. These protection zones can be determined using scientific methods and information about the ground and water around the well or intake. There are two approaches to creating protection zones:

- Use a set distance from the well or intake to determine the boundary of the protection zone, also known as a **fixed radius**.
- Base the distance to the boundary of the protection zone on the time it would take for contaminants to get to the well or intake, also known as the **time of travel**.

There are several methods available to calculate the distance to the boundary of the protection zone from the well for a groundwater source and from the intake for a surface water source. A map is helpful to display the protection zone you create around the well or intake.

Time of travel calculations may constitute geoscience work. Geoscience is a regulated profession in Ontario under the Professional Geoscientists Act. Hydrogeology, or the study of water underground, is an area of geoscience. Professional Geoscientists, and Professional Engineers who are both competent and qualified, conduct hydrogeological work.

> Sometimes there is a connection between groundwater and surface water in drinking water wells. You might see this in wells that are located close to surface water bodies or when wells are improperly constructed, maintained or abandoned. This connection often results in surface water pathogens getting into groundwater. Protection zones for these groundwater systems may be established by groundwater methods or combined with surface water methods. Professional Geoscientists and Professional Engineers can determine an appropriate method for delineating these protection zones.

Groundwater protection zones

Groundwater protection zones represent the area of land at the ground surface where water is captured by the well. Within this area, certain activities may pose a risk of contamination to the water used for drinking. Outside of these areas, groundwater does not move toward the well and does not need to be considered when determining protection zones.

Your well's water supply comes from the **capture zone** of the well, which includes upland recharge areas and the zone of influence.

Recharge areas are where rain and melting snow infiltrate directly into the ground rather than flowing over the land.

The water table is the location below the ground where the spaces in soil or cracks in rock are filled with water. Groundwater does not move in underground rivers, but rather flows under the influence of gravity along a gradient from areas of higher water table elevation (upgradient) to areas of lower water table elevation (downgradient).

The zone of influence is the area that contributes water to the pumping well. When groundwater is pumped from a well, it is pulled towards the well from every direction. This action is strongest at the well and decreases as you move away from the well.

You can use one or more scientific methods to create one or more protection zones around your drinking water well to protect the source.

Where several wells have overlapping protection zones, you can combine the zones of the individual wells into a larger single zone for protective action. Similarly, if narrow strips of land exist between protection zones of neighbouring wells, you can incorporate the area in between, and protect the whole area as a single zone.

Method	Cost and complexity	Accuracy	Resources needed
Arbitrary fixed radius – groundwater	Low cost, quick and easy	Not the most accurate	Very few
Calculated fixed radius	Low cost, easy to apply	Somewhat accurate	Few
Uniform flow method	Moderate cost, moderately complex	Accurate	Some
Two-dimensional analytical model	Moderate cost, moderately complex	Accurate	Some
Computer based three-dimensional model	High cost, very complex	Can be very accurate	Many

Arbitrary fixed radius – groundwater

This method is as simple as drawing a circle around your well. You can use it when data and information resources are limited or when you want to quickly create a protection zone with little technical expertise. It is a cost effective and easy way to identify a protection zone with minimal effort. However, its limited scientific basis could lead to overprotecting some areas or not protecting others.

You will need to know the location of the well and the distance you want to protect. You can base the distance on very generalized considerations of soil and groundwater and/or professional judgement.

Example: The fixed radius could be based on averaging the distances that correspond to a time of travel for various soil types, such as in the state of California, which uses a minimum radius of 300 metres and 450 metres to represent the 5- and 10-year time of travel zones, respectively, for highly permeable sand and gravel aquifers. For fractured rock aquifers, they increase the radius of each protection zone by 50 percent.

Or you may also want to consider:

- The Director's Technical Rules under the *Clean Water Act*, which uses a fixed radius of 100 metres to protect the most vulnerable area next to a well.
- Ontario Regulation 267/03 under the Nutrient Management Act also protects municipal wells with a 100-metre buffer.
- In British Columbia, an arbitrary fixed radius of 300 metres is often used.

Choosing a large fixed radius can increase protection but may also mean that more people living and working in the protection zone would be affected than is necessary. It also might make it more difficult to defend the protection zone boundaries if they are challenged later. Public support for using this method is an important consideration.

You may want to establish multiple protection zones. With this strategy, you can use more stringent tools to manage activities that could pose a risk to drinking water in the protection zones closer to the well and softer tools to manage activities in the protection zones farther from the well.

Suggested arbitrary fixed radiuses

These are based on averages in provincially approved source protection plans.

- 100 metres to protect the most vulnerable area next to the well.
- 500 to 900 metres to protect against pathogens like bacteria and viruses that usually die off within about 2 years of travel time before getting to the well.
- 1,000 to 1,600 metres to protect against chemical contaminants and pathogens that usually break down within about 10 years of travel time before getting to the well.
- 1,700 to 3,000 metres to protect against persistent and hazardous chemicals that usually persist in the environment for about 25 years of travel time before getting to the well.

If you know which contaminants you want to protect against, you can choose to delineate protection zones that correlate with the times of travel above.

> Example: If pathogens from agricultural activities near your well are the only concern, you may not need to delineate a zone to protect against persistent and hazardous chemical contaminants.

Calculated fixed radius

This method, also known as the “cylinder method,” creates a circular protection zone. The radius of the circle is calculated using either:

- the volume of water pumped by the well over a specified period of time
- calculating the speed of the groundwater and multiplying by a chosen time of travel.

It is based on simple hydrogeologic principles and requires limited technical expertise.

You will need data on the pumping rate and/or water use, the thickness of the aquifer or well screen length, and the porosity of the aquifer. Porosity represents the amount of spaces between grains of soil, estimated as a percentage of the total volume of pore space held by water, for different soil types.

> Example: Sand and gravel can have a porosity percentage as high as 25%-50%, while for dense, solid bedrock it may be less than 0.1%.

You can delineate multiple zones using this method and take a similar management approach to that presented in the arbitrary fixed radius method.

Modified calculated fixed radius method

The calculated fixed radius method does not account for the direction that groundwater is flowing. Therefore, this method may over-protect the zone downgradient of the well (where the groundwater has already moved past your well) and under-protect the zone upgradient of the well (where the groundwater is coming from). You can apply a modified calculated fixed radius method if you know the groundwater flow direction. This shifts the circle upgradient and may provide better protection of upgradient activities that can pose a risk to your drinking water source.

To use this modified method, first calculate the fixed radius. The upgradient portion of the protection zone is estimated as one and a half times the calculated radius. The downgradient extent of the protection zone is one half of the calculated radius. The resulting shape is a circle with a radius of R, shifted upgradient by a distance of 0.5R.

To determine the groundwater flow direction, you will need advice from a Professional Geoscientist or Professional Engineer who is both competent and qualified to undertake such activities. Professionals can be found through local listings in your area. You can also view public registers of Professional Geoscientists on the Professional Geoscientists Ontario website and Professional Engineers on the Professional Engineers Ontario website.

Half circle calculated fixed radius method

The half circle calculated fixed radius method incorporates flow direction by replacing the circular shape of the protection zone with a half circle that has the same area. This method results in a protection zone that more closely resembles shapes derived from the uniform flow method. The half circle is oriented in the upgradient direction of groundwater flow.

To provide protection for the downgradient zone of influence, a small circle is delineated around the well. Lines are drawn out from the smaller circle to the boundary of the half circle. The radius of the small circle is dependent on the pumping rate of the well. Generally, if the pumping rate is 9.5 cubic metres per day or less, the radius of the small circle is 15 metres.

Uniform flow method

This method calculates the distance to the protection zone boundary by solving analytical equations using a known time of travel. It assumes groundwater moves at a steady state and that the natural conditions are fairly uniform. The uniform flow method can be done with hand calculations or with the help of relatively simple computer programs. Hire a Professional Geoscientist or Professional Engineer who is qualified to conduct hydrogeological assessments to do this work for you. Professionals can be found through local listings in your area. You can also view public registers of Professional Geoscientists on the Professional Geoscientists Ontario website and Professional Engineers on the Professional Engineers Ontario website.

You will need to have data on the geology of the area and the hydrogeology of the aquifer. The uniform flow method is more flexible than standard analytical equations since it can adjust to changes in flow direction. The disadvantage is that this method generally does not take into account hydrogeological boundaries like streams, lakes, recharge areas, etc. or variability in hydrogeology.

Two-dimensional analytical model

This method calculates the distance to the protection zone boundary by solving analytical equations (such as the uniform flow method) using a known time of travel. The model equations map protection zones in plan view (two dimensions). It's reasonably easy to apply with some technical expertise. Hire a Professional Geoscientist or Professional Engineer who is qualified to conduct hydrogeological assessments to do this work for you. Professionals can be found through local listings in your area. You can also view public registers of Professional

Geoscientists on the Professional Geoscientists Ontario website and Professional Engineers on the Professional Engineers Ontario website.

You will need to have data on the geology of the area and the hydrogeology of the aquifer. Computerized two-dimensional analytical models, such as the Wellhead Protection Area (WHPA) Model and the Wellhead Analytic Element Model (WhAEM), are available free of charge from the United States Environmental Protection Agency, or other computer programs can be used.

An analytical model can often provide a good approximation of the time of travel boundaries. However, locations with variable natural features may require more sophisticated methods, such as detailed hydrogeological mapping or numerical modeling.

Computer based three-dimensional model

This method uses a computer to solve mathematical equations to simulate or 'model' how water and contaminants move in groundwater. Essentially, the computer program creates a three-dimensional grid that simulates the aquifer. At each grid node, hydrogeological information is input into the program, allowing the model to predict groundwater flow and the movement of contaminants. When properly set-up and calibrated, these models produce more realistic time of travel estimates than the analytical or semi-analytical approaches.

You will need a lot of good quality data on:

- the geology of the area
- hydrogeology of the aquifer
- water quality

Computer based three-dimensional models account for local information and complex natural features for better accuracy but poor data quality can impact model predictions.

Running computer based three-dimensional models requires specialized technical expertise. Hire a Professional Geoscientist or Professional Engineer who is qualified to conduct hydrogeological assessments to do this work for you. Professionals can be found through local listings in your area. You can also view public registers of Professional Geoscientists on the Professional Geoscientists Ontario website and Professional Engineers on the Professional Engineers Ontario website.

Surface water protection zones

Drinking water from a surface water source is transported through a pipe directly from the lake, river or stream. The entry point of your raw water supply is called the intake. Surface water protection zones are made up of the land and water near the location of the intake. The land portion of the protection zone is called the setback. In these areas, certain activities and land uses can pose a risk to drinking water sources.

Setbacks are areas of land that drain into the surface water source. This part of the land next to a surface water source helps to control the runoff flow (slow down the water speed) and to allow enough time to let water infiltrate into the ground. When it rains a lot or snow melts, some streams and rivers overflow into a flat low-lying area called a **floodplain**. When the stream or river is just about to spill onto its floodplain, the water level in the channel is called the **high water mark**. Setbacks can be measured from the **high water mark** or you can use the area of land within **floodplain** mapping for a 100-year **flood event**, similar to the conservation authority regulation limit. The high water mark can be measured using a physical marker or observed as a natural line on the landscape.

Floods and floodplains are rated statistically for the expected time between **flood events**.

Example: A 100-year flood is a flood that is expected to occur once every 100 years. In other words, it has a 1 percent chance of occurring in any one year.

Generally, 120 metres measured from the high water mark is an adequate setback. This distance (or the conservation authority regulation limits, whichever is greater) is used in the Director's Technical Rules under the *Clean Water Act* to develop protection zones. You can also use this distance in the absence of data or technical resources.

Setbacks can also be extended to consider local information such as the type of surface soil, local topography of the land, size of the water course, preferential pathways and land use. Smaller setbacks can be used if the area within 120 metres does not drain into the protection zone associated with the water course.

The provincial land use planning framework generally suggests that if there is a proposed land use within 120 metres of a surface water feature (such as a lake, river or stream), a hydrological evaluation is required to establish a vegetative protection zone around the feature. This is consistent with Policy 4.2.4 in the Growth Plan and the Oak Ridges Moraine Conservation Plan, which use the terminology "key hydrologic features" instead of the more general "surface water" and can help protect the feature and its function, provided a minimum 30-metre setback be maintained.

Conservation authorities have flood maps that show their regulation limits. Where floodplain mapping isn't available within the conservation authority watershed, other mapping such as fill regulation mapping or regulated areas mapping may be available. Floodplain and other mapping resources can be found on Conservation Ontario's website. In areas where there are no conservation authorities, the Ministry of Natural Resources and Forestry has published technical guides on natural hazards to support municipal implementation of the natural hazard policies in the Provincial Policy Statement. These can be ordered directly from the Ministry of Natural Resources and Forestry to assist with flood mapping when needed.

You can use one or more scientific methods to create one or more protection zones around your drinking water intake to protect the source.

Method	Cost and complexity	Accuracy	Resources needed
Arbitrary fixed radius – surface water	Low cost, quick and easy	Not the most accurate	Very few
Analytical approach	Moderate cost, varying complexity	Accurate	Some
Numerical model	High cost, very complex	Can be very accurate	Many

Arbitrary fixed radius – surface water

This method involves drawing a circle or semi-circle around the intake. You can use it when data and information resources are limited or when you want to quickly create a protection zone with little technical expertise. It is a cost effective and easy way to identify a protection zone with minimal effort. However, its limited scientific basis could lead to overprotecting some areas or not protecting others.

You will need to know the type of water body (river, lake or both), the location of the intake and the distance you want to protect. The Director's Technical Rules under the *Clean Water Act* use the following fixed radiuses to protect the most vulnerable areas next to the intake:

Drinking water source	Common fixed radius distances
Lake	Full circle of 1000 metres
Large river or river connecting the Great Lakes	Semi-circle of 1000 metres upstream of the intake and a 100 metre rectangle extending downstream
Small or inland river	Semi-circle of 200 metres upstream of the intake and a 10 metre rectangle extending downstream

When the circle or semi-circle is fully in water, the protection zone does not need to include land. Where the circle or semi-circle intersects the land, a setback should be included in the protection zone. In the absence of data or technical resources, you can use 120 metres from the high water mark as the setback.

You can also establish multiple protection zones using the fixed radius method. With this strategy, you can use more stringent tools to manage activities that could pose a risk to drinking water in the protection zones closer to the intake and softer tools to manage activities in the protection zones farther from the intake. Below are some suggested arbitrary fixed radiuses you can use to establish multiple protection zones. These are rough estimates based on averages in provincially approved source protection plans.

For inland rivers and lakes:

- 200 metres to protect against contaminants that would have little to no chance for dilution before they reach the intake (where you wouldn't have time to respond to a spill)
- 500 to 1000 metres to provide about 2 hours to respond to spills
- 1500 metres or the watercourse of the entire watershed

For large water bodies like the Great Lakes and their connecting channels:

- 1000 metres to protect against contaminants that would have little to no chance for dilution before they reach the intake (where you wouldn't have time to respond to a spill)
- 2000 metres to provide about 2 hours to respond to spills
- 3000 metres

Analytical approach

This method calculates the distance along the surface water body to the protection zone boundary by solving analytical equations using a known time of travel, such as 2 hours. Distances are determined from the simple concept of speed, time and distance (Distance = Speed × Time). It is reasonably easy to apply with some technical expertise.

Three features that contribute to the source water can be included in the calculations:

- the type of water body (river, lake or both)
- storm or sewer pipeline systems (if there are any)
- a setback on the land (if needed)

You will need to have data on the size and shape of the channel, the speed of the water, and the characteristics of sewer systems if present. The Manning equation is the most common way to estimate the speed of the water **(Speed = $1/_{n} \times R^{2/3} \times S^{1/2}$),** where **n** is the Manning coefficient (friction coefficient), which varies from 0.001 to 0.03 based on the type of material along the river bottom and the flow, **R** is the hydraulic radius (in metres), which in most cases is equivalent to the depth of the water in the river, and **S** is the slope of the river.

You can use a 2 hour time of travel or increase the time of travel if you know your drinking water system's spill response time, also known as the time needed to shut down or provide treatment in the case of a spill.

Numerical model

This method uses a computer to solve mathematical equations to simulate or 'model' how water and contaminants move in rivers, streams and lakes. You will need a lot of good quality data on the size and shape of the channel, water depth and speed, wind speed, water currents and water quality parameters such as temperature and turbidity (a measure of how cloudy the water is due to sediments suspended in the water). Numerical models account for local information and complex natural features for better accuracy but poor data quality can impact model predictions.

Numerical model equations are solved for multiple locations and times under different conditions to reflect changes in the natural environment. Single (constant) values can be used for various parameters such as water depth, speed and temperature if the numerical model is being used to simulate a short period of time. If there is enough data available, models can simulate longer periods of time to reflect changes to the system from things like weather and climate. In this case, the water depth, speed and temperature cannot be assumed constant and multiple values would be needed.

Several numerical modelling codes are available and can represent the natural environment in one, two or three dimensions. The option you pick depends on the complexity of the natural environment and the data available. One- and two-dimensional numerical codes are commonly used. Three-dimensional numerical codes can be used for situations where the circulation of water is too complicated to be represented by a one- or two-dimensional model such as for the Great Lakes.

Running numerical models requires specialized technical expertise from a hydrologist or Professional Engineer. You can hire a specialist to do this work for you.

New or changing municipal residential drinking water systems

A new or changing municipal residential drinking water system within an established source protection area may not yet be included in a source protection plan.

Ontario Regulation 205/18 under the *Safe Drinking Water Act* requires municipalities within source protection areas to ensure sources of drinking water for new or changing municipal residential drinking water systems are protected before providing water to the public. In these cases, technical work to identify protection zones must follow the Director's Technical Rules under the *Clean Water Act*.

Provincially approved source protection plans generally use computer based three-dimensional modelling to delineate protection zones; however, this is not the only way to delineate these areas, and the Director's Technical Rules allow for less complicated methods. You can use the scientific methods provided above, where appropriate, to help you identify the best method to incorporate your drinking water system into your local source protection plan that meets the requirements of the Director's Technical Rules and is appropriate to local conditions and available data and resources.

For groundwater sources, where the protection zone boundaries need to be determined using a time of travel method, these include:

- a computer based three-dimensional groundwater flow model
- two-dimensional analytical method
- uniform flow method
- calculated fixed radius method

For surface water sources, you can use the analytical approach or numerical model in accordance with Part VI of the Director's Technical Rules.

For municipalities

Communal drinking water systems can end up under your care and control. Whether this is a planned transition or becomes necessary due to inadequate operation of the system by the owner, this transition can result in responsibilities that you may not have planned for, including:

- Responsibilities to incorporate the drinking water system into the local source protection plan at your expense.
- Legally binding source protection plan policies that can affect existing property owners, businesses and your municipality.

Consider the long-term ownership of any proposed communal drinking water systems. You can require that development proposals that rely on such systems be subject to conditions as part of the development approval. Conditions could include requiring the developer to complete any potentially required source protection plan technical work or financial assurance to complete such work should the system become your responsibility in the future.

Learn about how Ontario Regulation 205/18 applies to you.

Manage risks to drinking water sources

Take our survey to share your feedback on our best practices to protect sources of drinking water.

Activities that can pose a risk

Certain activities can pose a risk to drinking water if pollutants are released to the environment. Pollutants, also called contaminants, are either:

- **chemicals**, such as fuels, solvents, metals and pesticides
- **biological pathogens,** such as bacteria and viruses

If one or more of the listed activities occurs near your well or surface water intake, or within a drinking water protection zone that you have created, then there is a potential for contamination of your drinking water source. Drinking water protection zones are areas of land where drinking water sources could be at risk of contamination from certain activities.

Activity	Examples
Liquid fuel and fuel oil handling and storage	Home heating, gas stations, bulk plants and pipelines, marinas and ports, farms, public works yard, rail lines, main highways
Chemical handling and storage	Body shops, garages/repair shops, car washes and salvage yards that use paints and degreasers, dry cleaners (where chemicals are used), industrial manufacturing and processing of chemicals such as paints, fertilizers, pharmaceuticals, cosmetics, solvents and fire retardants, metal plating, furniture refinishing, tanneries, wood treating and electronic equipment
Application, handling and storage of road salt	Roads, parking lots, public works yard

Activity	Examples
Waste disposal, storage and processing	Landfills, mine tailings, snow storage and disposal, recycle processing and storage of waste where generated (for example, manufacturing)
Stormwater management	Stormwater management facilities, commercial car or truck washes, sewage treatment plant effluent discharges, sewer systems and related pipes
Septic systems	Residential systems, small- and large-scale commercial/industrial/institutional systems
Agricultural operations	Application, storage, handling and management of manure, pulp and paper biosolids and sewage biosolids, application, storage and handling of pesticides and fertilizers, livestock grazing or pasturing

Some of these activities are regulated by the province, with measures taken to protect drinking water sources. If a provincial approval or registration is already in place, you may not need to take additional management actions.

Identify local risks

If you know, or are already concerned, about specific activities that are impacting or may impact your drinking water sources in your protection zone, you can focus your efforts on managing them.

If you don't know which activities may be of concern, start by thinking about current activities, as well as future activities to prevent problems from occurring. Take into consideration local activities that may impact your drinking water source, such as those listed in the table above.

Conduct an inventory of activities to help identify activities and prioritize management actions.

Create an activity inventory form

Your activity inventory form can include:

- location of activity and contact names of the owner and/or operator
- type of activity
- age and condition of the facility
- likelihood of a spill
- whether there are any risk management measures in place
- whether the activity is managed by provincial regulations
- whether contaminants associated with the activity are biological pathogen, chemical or both
- if you know any potential contaminants associated with the activity, and whether they have been detected in your drinking water supply

Conduct the inventory

You can use any of the following methods to conduct as comprehensive an inventory as resources (staff, cost, time) allow. These methods are listed in order of increasing resources needed:

- desktop inventory
- windshield survey
- email or online survey
- mail survey

- virtual meetings
- phone survey
- door-to-door survey
- personal interviews
- field inspections

Choosing an inventory method, or combination of methods, should consider the type(s) of activity(ies), the efficiency of the inventory method and how much detail is needed to make further management decisions.

> **Example:** A farm might be best assessed by interviewing the farmer, a dry cleaner might require a site inspection, while a door-to-door, mail or online survey may be a more efficient choice for a trailer park with a septic system.

When conducting the inventory, remember that several activities may be occurring at one facility.

> **Example:** A gas station may have an underground storage tank for fuel and an onsite septic system.

As an alternative to soliciting information about activities on a property, you can make assumptions about activities and then confirm with property owners whether those activities are occurring.

> **Example:** You may assume that all buildings or residences located in your protection zone store heating/furnace oil fuel and then allow property owners to correct this assumption via a questionnaire or survey.

Desktop inventory information sources

You can use readily available information sources to make a list of activities that could pose a risk to your drinking water source, including:

- Google maps and Ontario's GeoPortal
- current and historical aerial photographs
- telephone directories
- real estate title searches
- zoning and land use maps
- waste management databases (such as Hazardous Waste Information Network)
- fire insurance plans
- environmental reports
- provincial and federal records and databases
- municipal permits and licences

Using these information sources can give you an idea of the types of businesses and other activities in your area to create a desktop inventory of activities that may pose a risk to your drinking water. These sources are available by talking to local residents, or at:

- public libraries or archives
- provincial, regional and municipal government offices

You may want to consider cross-referencing multiple information sources to verify their accuracy.

> Environmental permissions set rules for certain activities that could potentially contaminate the environment. Learn more about environmental permissions and how to find detailed information about environmental approvals and registrations in your community and locate Ontario facilities on an interactive map. This information may help inform your activity inventory.

Map activities

Mapping activities is a simplified way to assess risk and prioritize your management actions. You can use any maps you've created that show the location of your drinking water protection zones and add the location of activities in your inventory to see where they overlap.

You can map discrete activities, such as a gas station, with a point (with coordinates) on your map. Activities that extend across greater distances such as sanitary sewer lines, can be displayed as a line feature. Wide-scale activities that cover larger areas, such as application of manure on farm fields, can be represented as a polygon shape.

You can also use more advanced mapping techniques like computerized Geographic Information Systems (GIS). These systems can 'layer' data electronically using shapefiles (GIS layer) or spreadsheets with x,y values to represent spatial locations.

You can also upload your data directly into the Source Protection Information Atlas following the steps below:

1. Open the Source Protection Information Atlas, click Tools, and then click Upload Data.
2. Locate your shapefile or spreadsheet using Choose Files.
3. Give your layer a name and symbol and click Upload.
4. You should now see your layer in the Map Legend (note your layer is only temporarily available and no one else can see it).

Prioritize activities

When prioritizing which activities to manage, consider:

- The location of the activity in relation to your drinking water well or intake.
- The type of contaminants associated with the activity.

A basic understanding of common contaminants associated with the risk activity can help you identify which activities are a higher risk and should be addressed first. Identifying priorities will help you direct work to where it is most needed to protect the drinking water source.

> **Example:** Septic systems that are far away from a well may pose a lower risk than ones close to a well, in terms of potential for biological contamination. Activities such as dry cleaners may still pose a high risk far away from a well, because of the particular chemical contaminants associated with them.

You can also consider the age and condition of the facility where the activity is taking place.

Example: You may want to focus management actions on a gas station with aging infrastructure rather than a gas station with newly installed, leak-resistant tanks.

Manage local activities that may be a risk

There are many tools available to help develop local management strategies to minimize the risk that identified activities may pose to your drinking water source.

Decide on a management approach

There are several factors to consider when selecting the most appropriate tool or combined approach. Ask yourself:

- Is the activity occurring now? In the past? Predicted to occur in the future?
- How hazardous is an activity, and what is the likelihood of a negative impact from that activity?
- Is the management tool protective enough to manage the activity?
- Do you have the time, staff and resources to develop and administer the tool? Do you have the legal authority to implement the tool?
- How much time will it take to implement?
- Is there community support or opposition from landowners?
- Does the science that determined your protection zone support the type of management tool?

Management tools

Management tools can range from restrictive rules that prohibit certain activities from occurring to less restrictive strategies that help people carry out activities responsibly. The tools listed in the table below are similar to the approaches used in local source protection plan policies under the *Clean Water Act*.

Management tool	Who can use it?	Restrictiveness	Advantages and disadvantages
Land use planning (for example, official plans, zoning by-laws, site plan control)	Municipalities and planning authorities	Very restrictive	Proposed land uses are managed through rules for future development. Requires resources to establish protection zones and policies and review applications.
Municipal by-laws and Building Code	Municipalities and planning authorities	Very restrictive	Future activities are managed through rules, and fines may be imposed for non-compliance. Requires resources to establish by-laws, review applications and for enforcement.
Incentive programs	Municipalities and communities	Moderately restrictive	Benefits those who need financial support to implement risk management measures. May have restrictive terms and conditions in order to access funding. Requires resources to run program. Could also include non-financial acknowledgement programs.

Management tool	Who can use it?	Restrictiveness	Advantages and disadvantages
Best management practices	Municipalities, communities, Local Services Boards and private drinking water system owners	Less restrictive	Promotes consistency and collaboration but are not enforceable. Requires support from affected property owners to follow the best management practices.
Education and outreach	Municipalities, communities, Local Services Boards and private drinking water system owners	Less restrictive	Provides the most flexibility but tools are not enforceable.

For municipalities and local planning authorities

There are many tools available to you through Ontario's land use planning system to help you meet your obligations under the Provincial Policy Statement and other provincial plans, where applicable, to protect sources of drinking water. Land use planning tools generally only apply to future uses.

You can:

- Direct development that may pose a risk to your drinking water source away from the protection zones you identified through official plan policies and zoning by-laws.
- Restrict land uses that may be a risk to your drinking water source.
- Use planning tools, such as a community improvement plan, to provide financial assistance with rehabilitating and redeveloping land, such as brownfields, within your established protection zones to help address historical environmental issues.

The Planning Act allows for regulation of land uses, not activities. Therefore, municipal planning documents may need to identify the land use category or type of development that encompasses the activity or groups of activities in question.

> **Example**: The activities of applying untreated septage to land or landfilling of municipal waste may be included in the land use category of waste disposal, whereas the activity of storing and using organic solvents for manufacturing could be included in the industrial land use category.

Municipal official plans

The Planning Act requires that certain development applications, such as subdivision approvals, be accompanied by a set of supporting studies for a complete application. **Prescribed supporting studies** include a servicing options report and a hydrogeological report prepared by a qualified professional (Professional Geoscientist or Professional Engineer), which assesses the groundwater and surface water quality and quantity impacts of the proposed development, and how the impacts will be managed.

Municipal official plans may include policies, with mapping of drinking water protection zones to direct future development away from the drinking water source. Municipal official plans must be consistent with the Provincial Policy Statement, and are required to conform to provincial plans, where applicable, to protect drinking water sources.

You can also use official plan policies to require other studies to support development applications. Additional supporting studies may include:

- **Disclosure reports** provide details on the activities and operations of the proposed development/use.
- **Geotechnical reports** prepared by a Professional Geotechnical Engineer characterize the soil condition and the status of groundwater resources (details from this report can also be included in the hydrogeological study).
- **Spill prevention and contingency plans** outline design measures, facilities and procedures to avoid and mitigate spills of contaminants.

You can also establish specific support materials, such as a checklist identifying all the required documentation. This type of material can help municipal staff assess the risk to your drinking water source and can be a valuable tool for pre-consultation.

Communal drinking water systems can end up under your care and control. Whether this is a planned transition or becomes necessary due to inadequate operation of the system by the owner, this transition can result in responsibilities that you may not have planned for, including:

- Responsibilities to incorporate the drinking water system into the local source protection plan at your expense.
- Legally binding source protection plan policies that can affect existing property owners, businesses and your municipality.

Consider the long-term ownership of any proposed communal drinking water systems. You can require that development proposals that rely on such systems be subject to conditions as part of the development approval. Conditions could include requiring the developer to complete any potentially required source protection plan technical work or financial assurance to complete such work should the system become your responsibility in the future.

Zoning by-laws

Zoning by-laws are used to control the use of land – the type of land use and the specifications relating to that land use. You can identify zones where certain land uses are allowed. Zoning can be used to restrict uses that may pose a risk to drinking water.

> **Example:** Within an area zoned for industrial development, part of those lands may overlap with a drinking water protection zone where certain industrial activities would pose a risk to drinking water. In the zoning by-law, you could choose to specify the specific types of industry that would not be permitted in that specified portion of the land use zone. In addition, you could use an overlay or some other distinction on your zoning map schedules to show the limits of your drinking water protection zones. This approach is often used for conservation authority fill regulation mapping.

Similarly, a zoning by-law can specify certain required design standards, including the location of a connection to municipal water and wastewater servicing. This can work hand-in-hand with an official plan policy and by-law under the Municipal Act to require connection to municipal sewage servicing. Zoning by-laws also allow you to restrict development that may pose a risk to the drinking water source in areas where there is no municipal sewage servicing.

Site plan control

Site plan control, under Section 41 of the Planning Act, is an important tool in regulating development. It can be used to ensure that the proposed development is designed in a way to minimize risks to your drinking water source.

You can consider developing content in your site plan control guidance document or manual that addresses sites that are located in your identified protection zones.

The table below provides examples of site plan control requirements that you can use to address various activities. Note that zoning by-laws can apply in agricultural areas, but for farms requiring a nutrient management strategy under the Nutrient Management Act, the size of manure storage is generally dictated through nutrient management plans and separation distances under the Act for phased-in farms.

Activity	Examples of potential site plan control requirements	Examples of potential zoning by-law requirements
Storage of hazardous waste	Specify location of storage facility on parcel of land	Maximum size of storage facility Specify which types of industrial/commercial uses are permitted
Storage of non-hazardous waste	Specify location of waste storage facilities on parcel of land	Minimum separation distance of waste storage from water features
On-site septic system	Specify location of septic tank and tile bed on parcel of land	Maximum size and capacity of tank Specify location of connection to municipal sewers
Stormwater management pond	Specify lot grading Specify location of pond on parcel of land	Specify location of connection to municipal sewers
Storage of unprocessed plant waste from food processing facility	Specify location of waste storage facilities on parcel of land	Minimum separation distance between storage facility and water features Maximum size of storage facility Specify which types of industrial/commercial uses are permitted
Storage of pesticide at a manufacturing plant	Specify location of storage facilities on parcel of land	Minimum separation distance between storage facility and water features Maximum size of storage facility Specify which types of industrial/commercial uses are permitted

Activity	Examples of potential site plan control requirements	Examples of potential zoning by-law requirements
Parking lot with road salt application	Specify lot grading and layout of parking lot	Maximum impervious surface area (where water cannot infiltrate into the ground) in consideration of climate change adaptation plans or stormwater management plans Minimum separation distance between impervious surfaces (such as roads) and water features
Storage of road salt at a manufacturing plant	Specify type of storage structure	Minimum separation distance between storage from roads and water features
Snow disposal site	Specify lot grading Specify location of dedicated snow storage	Maximum total impervious surface area
Industry storing fuel	Specify lot grading Specify type of storage structure	Minimum separation distance between storage tank and water features
Dry cleaning operation	Specify type of storage structure	Maximum size of storage facility Specify which types of industrial/commercial uses are permitted
Pharmaceutical production facility	Specify type of storage facility How the release of contaminants to the environment can be prevented in the stormwater management system	Minimum separation distance between storage structure and water features Specify which types of industrial/commercial uses are permitted

Community planning permit system

The community planning permit system is a land use planning tool intended to help promote development by combining zoning, site plan and minor variance processes into one application and approval process. This gives you a greater range of options than the conventional development approval process and can help protect environmentally sensitive areas and control development, including site alteration and the removal of vegetation.

> **Example:** You can protect water quality through the requirement of vegetative buffers and erosion control measures. In addition, you can apply conditions that need to be fulfilled either prior to or upon the issuance of a community planning permit (through a community planning permit system). These may include conditions related to ongoing monitoring requirements for the protection of the natural environment and

public health and safety. Alternately, you can include conditions for monitoring in a site plan agreement, outside of the community planning permit system.

Municipal Act authorities

Outside of land use planning, you can also consider your authority under other legislation to pass by-laws to control activities. Under the Municipal Act, you have broad powers to pass by-laws, including those that concern the economic, social and environmental well-being of your municipality and the health, safety and well-being of people. Limits apply, and by-laws cannot conflict with provincial acts and regulations. The City of Toronto has similar broad powers under the City of Toronto Act.

You can consider using these and other powers when putting local programs in place to manage certain types of activities in your drinking water protection zones or to help protect your drinking water sources.

Examples of local programs that may have taken the above powers into account include:

- The disconnection of roof downspouts from municipal sewers. This can reduce the volume of water collected by storm sewers, which can reduce municipal wastewater plant overflows, spills or bypasses during storm events.
- The collection of household hazardous waste. This can help keep hazardous substances from being released to the environment through improper disposal.

Building Code authorities

The Building Code sets requirements for the design and installation of on-site sewage (septic) systems, including minimum setbacks/clearances from wells and surface water features such as lakes and streams. Inspection programs for septic systems under the Ontario Building Code can help you identify septic systems that are not functioning properly or are poorly maintained. These may pose a risk to drinking water within a certain distance of wells and intakes. Inspection programs consist of regular inspections of the system and follow up actions to ensure septic systems are properly maintained.

Usually the property owner pays for the cost of the inspection but cost recovery through residential taxes is also an option. Funding programs are available through the Federation of Canadian Municipalities to help your residents offset the costs of replacing defective or substandard septic systems. You can choose who performs the inspections on your behalf such as municipal building inspectors/officials, health department staff, third party contractors or conservation authorities. Property owners also have the option to hire a qualified third party to conduct the inspection. You can decide how to administer and offset the costs of running the program in these cases.

Within source protection areas, the Building Code governs mandatory on-site sewage system maintenance inspection programs. You can establish areas where septic system inspections should happen and then these inspections become mandatory. The Ministry of Municipal Affairs and Housing has published a guide to help you implement a septic system inspection program. Other guides are also available to help you deliver your own program, including the Federation of Ontario Cottagers' Associations, who have published a guide for septic system re-inspection programs for lake associations.

Municipal education and outreach programs

Municipal education and outreach programs can also raise awareness of protecting drinking water sources among landowners. These programs advise on the steps landowners can take to protect their own private wells and neighbouring drinking water systems, such as ensuring their septic systems are functioning properly and any sources of contaminants on their property (such as fuel oil and pesticides) are properly stored and managed.

You can collaborate with neighbouring municipalities (or upper tier municipalities, where applicable), conservation authorities and/or health units to roll-out education and outreach programs.

An education and outreach program can include:

- written materials, such as brochures, fact sheets, internet sites, documentation of best management practices
- community outreach, such as presentations before local communities, school programs
- special activities, such as workshops, demonstrations and tours, videos, slide presentations
- media liaison, such as press releases

Local circumstances will guide specific education and outreach requirements.

Best management practices can help protect sources of drinking water by providing guidelines for businesses to follow that can help prevent contaminants from reaching source waters. Often, these guidelines have added benefits to the potential polluter, by reducing costs and liability, improving worker health and safety, and enhancing public image.

> **Example:** Best management practices for chemical handling and storage include implementing an early warning system/emergency response plan for spills and facility shutdown (includes treatment and alternate water distribution).

In addition, you can create incentive programs to help landowners offset the cost of implementing best management approaches.

Conservation Ontario has a wide variety of information and tools to help you undertake education and outreach campaigns on a number of activities that may pose a risk to your drinking water source. In addition, you can also visit local or nearby conservation authority source protection websites for local education and outreach materials.

For Local Services Boards, communities and private landowners

As a Local Services Board, community, or private landowner relying on a shared drinking water source, you have a unique opportunity to protect your drinking water source and those of your neighbours. Even though you do not have the rule-making authority that municipalities and local planning authorities have, you can make a difference by taking steps independently to manage activities that could pose a risk to drinking water.

You can:

- Ensure that septic systems are functioning properly.
- Properly store and manage any on-site sources of potential contamination (such as pesticides and fuel oil tanks).
- Choose native plants and landscaping that may require less fertilizers and pesticides to maintain.
- Ensure proper sealing and decommissioning of nearby abandoned or unused wells.
- Site your well and/or septic system using best practices.
- Self-evaluate the everyday practices and activities occurring around you and/or your community to assess the potential for on-site and off-site contaminants to your system.
- Ensure you have an action plan in place in the event of a spill or contamination.
- Talk to your neighbours and encourage good water stewardship and conservation practices in your community.

Resources are available to help you take action:

- Ontario Ministry of Agriculture, Food and Rural Affairs: Best management practices: Water Wells (Free to order)
- Ontario Well Maintenance Technical Bulletin
- Chapter 4 of the Ministry of the Environment, Conservation and Parks' Water Supply Wells: Requirements and Best Practices document and the Ministry of the Environment, Conservation and Parks Wells on Your Property webpage
- Smart about Salt
- Conservation Authority information/funding opportunities:
  - Central Lake Ontario Conservation Authority – Well Decommissioning Program
  - Lake Simcoe Region Conservation Authority – Decommissioning, rehabilitation of wells on farmland
  - Toronto and Region Conservation Authority – Rural Clean Water Program
- Source Protection Authority websites:
  - Cataraqui – Best management practices for homeowners and the groundwater protection workbook for well and septic owners
  - Trent Conservation Coalition – Landowners Roles and Responsibilities
- Public Health Units:
  - Region of Peel Health Unit – Private Wells
  - Public Health Grey Bruce – Private Drinking Water
- Risk Management Catalogue
- Septic Smart! provides provincial resources for maintaining your septic system

A watershed approach

Knowing more about your watershed will help you understand how your drinking water system fits into the bigger picture of how land use and water supply needs are managed.

A watershed, also known as a drainage basin or catchment area, is an area of land where rain and snow drains or flows into one water body such as a marsh, river or lake. The Provincial Policy Statement defines a watershed as an area that is drained by a river and its tributaries. Watersheds are generally defined by the elevation of the land, also known as topography and neighbouring watersheds are usually divided by areas of high ground. Watersheds can be divided into subwatersheds based on the size of the watershed and the number of streams contributing to the water body.

All the water that enters a watershed flows to the same place, and contamination and land use in one part of the watershed can affect other parts. Understanding your watershed, and the activities occurring within it, can help manage risks to drinking water sources.

For areas of the province with completed source protection plans, watersheds have been characterized by the following key elements:

- boundaries and subwatershed boundaries
- land uses, population and location of towns and cities
- location of drinking water systems and the areas they serve
- water bodies and types of soil and rock in the watershed
- weather conditions
- surface water and groundwater quality and quantity
- water use and potential stresses on water supply
- activities that may pose a risk to drinking water sources

Watershed resources

Many of Ontario's watersheds have already been mapped. The resources listed can help you determine your watershed's boundaries and characteristics. You can add your watershed characteristics to these maps to help you understand the impact of human use activities on your drinking water source:

- Ontario's Watershed Boundary data (Primary, Secondary, Tertiary, and Quaternary)
- Create or order topographic maps
- Geographic data can be found through the Land Information Ontario database
- Make watershed maps and calculate flow and stream characteristics using the Ontario Flow Assessment Tool
- The Source Protection Information Atlas can be used to see watershed and topographic layers for Ontario

You may also wish to contact your local or nearby Conservation Authority through Conservation Ontario for further resources and assistance.

For municipalities

Planning at the watershed scale is useful for long-term consideration of cumulative impacts of development on drinking water sources. You can use source protection information and actions as part of your strategy to protect your watershed and to provide information for understanding watershed characteristics, risks to watersheds, and threats to water quality and quantity of municipal drinking water sources.

Building on drinking water source protection, broader watershed considerations include the following:

- climate change mitigation and adaptation considerations, including the assessment of severe weather events and drought conditions
- water, wastewater and stormwater servicing needs – location and distribution of systems and potential impacts to the quality and quantity of water
- identification of water related areas, features and functions, like significant groundwater recharge areas, that are necessary for the hydrologic integrity of watersheds
- nutrient assessments and land use scenario modelling – to assist in the development of land use and water management goals and recommendations to address the impacts of growth and servicing
- types of plants and trees, wetlands, and other natural characteristics
- impervious cover, like building roofs, parking lots, and roads
- environmental monitoring
- fisheries and other aquatic habitats
- habitats of species at risk

You can incorporate this information into your management strategy to protect your drinking water sources.

Review the actions you are taking to protect drinking water sources

Take our survey to share your feedback on our best practices to protect sources of drinking water.

Review past actions

Reviewing your management actions regularly will help you identify any issues that need immediate action. It will also help you improve or revise your strategy to deal with activities that may pose a risk to your water supply.

You can conduct a simple check-in or a more thorough assessment of your management strategy.

Whoever is responsible for implementing a management action should be asked to review and report regularly on their progress. This kind of review will focus on the status or progress of management actions. Essentially, what you want to know is whether any regulatory policies you developed and put in place are being complied with, and/or whether any non-regulatory policies have been adopted. This may also include regular tracking to ensure that the management actions have not failed.

> **Example:** If you have built a fence to keep cattle away from a drinking water well or have upgraded storage facilities for fuel or other chemicals, these installations should be inspected regularly to ensure they continue to provide protection.

Environmental monitoring

Source protection is based on preventing contamination, rather than restoring a source that has already been contaminated. Tracking the implementation of the management activities, rather than sampling and testing water, may give you a better idea about whether your source of water is being protected.

Environmental monitoring, which includes taking samples and testing water in your area, may only provide beneficial information about how effective a management action is in a small number of situations.

> **Example:** Environmental monitoring may be appropriate if testing of the raw water in your drinking water system over time has shown that your current source is contaminated. For these situations, monitoring can establish a baseline, if unknown, and measure improvements in the water quality as a result of the management actions. This type of monitoring should be linked to a specific property(ies) or activity within the protection zone; otherwise it could be very difficult to show a connection between specific activities and concentrations of contaminants in the watershed.

If there is no contamination identified in the raw water, sampling raw water would not provide information about management activities.

Regulated drinking water system operators are required to test water regularly. Reviewing the data collected by the drinking water system's operating authority may help you identify whether there are any changes in the quality of your drinking water source. You can request test results from the drinking water system owner/operating authority directly. In addition, information on previous years sample results are available in the open data drinking water datasets.

For municipalities

For ideas on how to track the implementation progress of management actions, see the table below.

Management tool	Who implements	What to look for	How to find it
Land use planning (for example, official plans, zoning by-laws)	Municipalities and planning authorities	Changes to official plans or zoning by-laws to map and establish policies that recognize the drinking water source protection zones	Contact the municipal planning department or clerk

Management tool	Who implements	What to look for	How to find it
Municipal by-laws and Building Code	Municipalities and planning authorities	Changes to municipal by-laws (for example, downspout disconnection by-laws, sewer use by-laws, household hazardous waste by-laws) and septic inspection programs	Contact the municipal public works or building department, or clerk to identify any new by-laws and the results of compliance programs (for example, inspections, surveys, testing)
Education and outreach, incentive programs, best management practices	Municipalities, conservation authorities, Local Services Boards, communities, social agencies, health unit, private owners	New or revised programs created and delivered over time, number of people participating in the programs, impact of programs	Contact the municipal clerk, conservation authority communications specialist, or any other local agencies that may be involved in environmental or public health initiatives

Update your management strategy and communicate progress

Continuous improvement is an important part of taking action to protect your drinking water source.

Update your management strategy as new information, such as technical data, new activities or updated land use planning documents, becomes available. You can use new information to update your inventory, reprioritize activities, and evaluate the appropriateness of your current management tools.

If local actions are not working, you may want to consider source protection planning under the *Clean Water Act*.

For municipalities and communities

Regular progress reporting identifies implementation challenges so that they can be addressed through changes to your management strategy. A report is a good tool for tracking and communicating your progress to the people who live in your municipality or community. Annual reports, like those required under the *Clean Water Act*, may be suitable to track progress and success of local programs/policies. Local source protection authority websites have examples of annual progress reports that you can refer to. You can change the frequency of the reports depending on your local needs and resources.

To create a report, begin by listing the management actions taken. Then, identify whether the action has been completed. For each of the actions, take the time to contact the person or organization responsible, and talk with them to identify:

- whether the action has been implemented
- whether any problems were identified
- whether anything needs to change

If your municipality or community has multiple drinking water systems and you've identified several protection zones, you may decide to create a report for each zone, or one report for all. It is up to you to determine the best way to organize and present the information.

A simplified report can be formatted and graded like a school report card, listing the effectiveness of the management activities, progress, and areas for improvement. Conservation authorities use report cards to grade watershed health in order to target management actions to address specific issues.

Include optional drinking water sources in a source protection plan

Take our survey to share your feedback on our best practices to protect sources of drinking water.

Overview

The *Clean Water Act* is one of many ways to protect drinking water. The purpose of the *Clean Water Act* is to protect existing and future sources of drinking water. The *Clean Water Act* requires source protection plans to include sources of water that supply municipal residential drinking water systems within established source protection areas. The *Clean Water Act* also allows for the protection of other drinking water sources within and outside established source protection areas.

Source protection plans under the *Clean Water Act* are locally developed and provincially-approved action plans. For drinking water systems that are not included in a source protection plan under the *Clean Water Act*, the province promotes using existing municipal and provincial regulatory tools, such as the Planning Act, Municipal Act, septic inspection programs under the Building Code and provincial environmental approvals and permits, along with incentive programs, education and outreach initiatives, and other direct actions, such as setting up secondary spill containment, inspecting your own septic system routinely, choosing alternatives to road salt and putting up a fence to keep cattle out of a stream, to ensure drinking water sources are protected.

If a drinking water system is brought into a source protection plan, it is subject to all the requirements of the *Clean Water Act*. This means that the system will undergo a rigorous scientific risk assessment, policy development and source protection plan implementation. This includes:

- Technical studies of the drinking water source
- Identifying activities that may pose a risk to the drinking water source
- Developing policies that manage activities that may pose a risk to the drinking water source
- Assessing uncertainty with the information used to support decision making
- Reporting annually to track implementation of policies
- Continuous improvement updates to the source protection plan

All property owners located in any delineated protection zones in a source protection plan are subject to all applicable plan polices. In some cases, a locally-directed source protection strategy for smaller or remote drinking water systems may be more appropriate to address very specialized and local considerations, instead of including the system in a source protection plan under the *Clean Water Act*. However, if you have tried an approach outside of the *Clean Water Act* and it isn't working, you may be able to bring your drinking water system into a provincially-approved source protection plan if you are located within a source protection area, or develop a source protection plan under the *Clean Water Act* if you are located outside of a source protection area.

Source protection areas are set out in regulations under the *Clean Water Act* and largely based on conservation authority watershed boundaries, covering most of southern Ontario and several urban centres in the north. Use the interactive Source Protection Information Atlas tool to see if you are located in a source protection area.

If you are located within a source protection area

There are options available if your drinking water source is located within a source protection area, after considering an approach outside of the *Clean Water Act*.

For municipalities

Unlike municipal residential drinking water systems, you can choose to include other types of drinking water systems located in source protection areas in the source protection planning process. If you have already tried an approach using your existing tools and have determined that you need the enforcement tools under Part IV of the *Clean Water Act* or land use planning decision-making compliance, you may want to consider including other drinking water systems.

Sections 57, 58 and 59 of the *Clean Water Act* ("prohibited activities", "regulated activities" and "restricted land uses", respectively) establish regulatory tools to address activities that are, or would be, significant drinking water threats. These are sometimes called Part IV tools because their authority is established by Part IV of the *Clean Water Act*.

Subsection 39(1) of the *Clean Water Act* requires that decisions under the Planning Act or the Condominium Act must conform with applicable significant threat policies set out in the source protection plan. These policies are legally binding on decision-makers, including municipal councils, municipal planning authorities, planning boards, and the Local Planning Appeal Tribunal (formerly the Ontario Municipal Board) and cannot be appealed.

Generally, any drinking water systems that are not municipal residential drinking water systems serving or planned to serve major residential developments may be included in the source protection planning process. Other types of drinking water systems that can be included in source protection plans through municipal council resolution are prescribed in regulation. Section 4.1 of the General Regulation (Ontario Regulation 287/07 made under the *Clean Water Act*) allows for an existing non-municipal drinking water system that serves one private residence and no other facility to be included in a source protection plan if:

- the well or intake serving the system is one of a **cluster** of six or more wells or intakes,
- the system is in an area of settlement (as defined in the Planning Act), or
- the private residence is a designated facility or public facility (as defined in Ontario Regulation 170/03).

Ontario Regulation 287/07 under the *Clean Water Act* does not describe the relative distance of the wells or intakes that make up a **cluster**. The definition of a cluster is open to interpretation so that a wide variety of natural conditions can be considered.

There are two options to include other types of drinking water systems: municipal council resolution or minister's designation.

- Subsection 8(3) of the *Clean Water Act* gives municipalities the authority to pass a municipal council resolution to add other drinking water systems to the terms of reference for local source protection plans.
- Subsection 10(6) of the *Clean Water Act* grants the Minister of the Environment, Conservation and Parks the authority to require other drinking water systems to be included in the source protection planning process.

For First Nations on reserve

The *Clean Water Act* allows drinking water systems serving reserves located within or adjacent to an existing source protection area to be considered as part of the source protection planning process.

There are several opportunities for your community to participate in the drinking water source protection process under the *Clean Water Act*, including:

- participate as a member of a source protection committee (where seats are available and your community has identified a representative)
- review and comment on amendments to source protection plans
- submit a First Nation band council resolution requesting that an existing or planned drinking water system serving or planned to serve a reserve be included in a source protection plan

If protection under the *Clean Water Act* is the best choice for your community, the process of including your system would be initiated by resolution of a First Nation band council. The province would then have the authority to include (through amendment to Ontario Regulation 287/07) your drinking water system. The specific details of including your system in the source protection planning process would be determined through discussions with the source protection authority and ministry, including identifying who would conduct the technical studies (the First Nation, the source protection authority, etc.) and how traditional knowledge will be considered.

Did you know?

Three communities have included their drinking water source in local source protection plans by Lieutenant Governor in Council regulation:

- Chippewas of Rama (South Georgian Bay-Lake Simcoe Source Protection Region)
- Six Nations of the Grand River (Lake Erie Source Protection Region)
- Chippewas of Kettle and Stony Point (Thames-Sydenham Source Protection Region)

Read about their source protection plan policies in the local source protection plans listed on the Conservation Ontario website.

For local planning authorities, communities and private landowners

If you are concerned about your source water, consult with the local source protection authority to determine if the *Clean Water Act* legal framework will address your specific concerns before requesting a municipal council resolution to include the system in a provincially-approved source protection plan.

If you are located outside of a source protection area

There are options available if you are located outside of a source protection area, after considering an approach outside of the *Clean Water Act*.

The Minister of the Environment, Conservation and Parks has the authority under subsection 108(c) of the *Clean Water Act* to create a new source protection area through regulation and in doing so may also name a person or body to be the source protection authority under section 5 of the *Clean Water Act*. The Minister may also use this authority to address drinking water systems in unorganized territories.

Did you know?

There are two source protection areas (Northern Bruce Peninsula and Severn Sound) that do not have Conservation Authorities that are set out in Ontario Regulation 284/07.

For municipalities

Under section 26 of the *Clean Water Act*, you can develop a source protection plan via an agreement between your municipality, or group of municipalities, and the Minister of the Environment, Conservation and Parks. The

Minister has wide authority under this provision to include any type of drinking water system in the agreement and to specify the nature and scope of the risk assessment and source protection plan (per subsection 26(4)).

Many municipalities in northern Ontario and other locations outside source protection areas have undertaken studies to help identify threats to their sources of drinking water. These studies, coupled with existing tools and legislation, can be used together to protect these sources of drinking water.

Contact us

For more information, email the Conservation and Source Protection Branch at the Ministry of the Environment, Conservation and Parks at source.protection@ontario.ca.

Ministry of the Environment, Conservation and Parks
Conservation and Source Protection Branch

Bulletin: Implementation of the 2021 Amendments to the Technical Rules under the *Clean Water Act, 2006*.

Date: February 15, 2022

Table of Contents

Ontario

Introduction

The *Clean Water Act, 2006* ("the Act" or "CWA") ensures communities protect their drinking water supplies through prevention by developing collaborative, watershed-based source protection plans that are locally driven and based on science. For additional information on the CWA and how the source protection plans are developed, readers may refer to this web page www.Ontario.ca/page/source-protection.

The Act and the General Regulation 287/07 (O. Reg. 287/07) establish a legal framework for drinking water source protection in Ontario. The Director's Technical Rules (Rules) (entitled "Technical Rules: Assessment Reports") are established under Section 107 of the Act and govern the assessment of risks to drinking water sources. The version of the 2021 Rules discussed includes the recent amendments to the Rules. These can be found at this link: www.ontario.ca/page/2021-technical-rules-under-clean-water-act.

Throughout this document, individual rules are referred to by the letter R in combination with the rule number. For example, "R11" means "Technical Rule 11". Similarly, threat categories and sub-categories are referred to by "# [threat number]". For example, "# 1.8" refers to threat *# 1.8 Storage of hauled sewage*. This reference number can be found in the tables of drinking water quality threats, now found in Part XII of the Rules.

While every effort has been made to ensure the accuracy of the information in this document, it should not be construed as legal advice or relied on as a substitute for referring to the Act, the regulations made under the Act, and the 2021 Technical Rules.

1-Purpose

The purpose of this bulletin is to provide an overview of the 2021 amendments[1] to the Rules to support understanding and implementation by a local authority (a source protection authority (SPA) or municipality) who is responsible for performing technical work/policy development and or updates to the assessment reports and source protection plans. Understanding these changes will help incorporate them into source protection plans and assessment reports (plans) through the processes outlined in section 34 or section 36 of the Act.

2-Background

The 2021 Rules took effect on December 3, 2021, and aim to:

- Clarify terminology, e.g. impervious surface methodology; naming convention for certain types of vulnerable areas (i.e. issue contributing areas; land setbacks from shore associated with intake protection zones; off-site contamination).
- Clarify the information needed to conduct a water quality climate change risk assessment.

[1] 2021 Rules contain the Tables of Drinking Water Threats in the same document (Part XII). The tables are no longer a stand-alone document.

- Clarify situations where a surface-water-based WHPA-E is to be delineated, i.e. groundwater and surface water interaction can impact water quality at a well (formerly known as Groundwater Under the Direct Influence of Surface Water wells).
- Clarify that the local threats provision intends to address activities that are not provincially or federally regulated and are area or community-specific.
- Update the Tables of Drinking Water Quality Threats (Tables) and integrate them into the Rules as one document.

3-Amendments governing delineation, vulnerability, and risk assessment

The Rule amendments explained in this section apply to any update directed by the Minister's Order under section 36 or amendment initiated by the source protection authority under section 34 of the Act.

3-1 Alternative Approach – R15.1:

R15.1 has been amended to reduce the administrative burden associated with the formal approval of a request to use an alternate method to gather information or perform tasks prescribed in the rules. Amended R15.1 requires the source protection authority or committee to obtain written consent from the Director of the Conservation and Source Protection Branch (CSPB) or any delegated ministry staff before using the alternate approach. This amendment ensures that the local authority has the ministry's concurrence of the alternative approach before pre-consultation and consultation.

3-2 Climate Change – R15.3:

R15.3 has been amended to set out the information required in the assessment report if a climate impact assessment is conducted.

Collaboration between municipalities, source protection authorities/committees, and others is highly recommended to obtain a general consensus to determine if a risk assessment should be conducted and what information should be included in the plan.

R15.3 does not prescribe an approach or a model for conducting the risk assessment, and it is up to the local authority to determine the appropriate tool and process to meet the R15.3 requirements. Refer to the bulletin "Considering Climate Change Impact on Water Quality under the Clean Water Act, 2006" for more information on this topic.

3-4 Issue Contributing Areas (ICAs) – R16(9), R47(7), R48(7), and R78.1:

ICAs are required when a drinking water issue is identified under R114. The 2021 Rules recognise the ICAs as a vulnerable area associated with either surface water or groundwater sources (i.e. IPZ-ICA or WHPA-ICA). These areas would focus on the activities that contribute to the issue meaning

the contaminant present in the source water that gives rise to the issue. The IPZ-ICA or WHPA-ICA depends on the delineated WHPA or IPZ and the activities contributing to the issue.

Where an ICA goes beyond WHPAs/IPZs (which may be very rare), there needs to be a connection between the area outside the WHPAs/IPZs and the relevant WHPAs/IPZs. For example, an existing highly vulnerable aquifer (HVA) is connected to the WHPAs, or a transport pathway connects the area to the IPZs.

The Rules require a rationale to support the size of the delineated ICA and evidence supporting the activities identified as contributing to the issue. This evidence can include environmental monitoring data, modelling, analytical mass balance, information about specific activities near the well/intake, etc. This information may be sufficient to delineate an ICA of a particular size/configuration, and when more information is available, the ICA can be updated.

The amended Rules apply when delineating new ICAs or when the local authority decides to re-evaluate an existing ICA's delineation due to new information or data. However, until such a re-evaluation, the existing ICAs remain in effect.

It is recommended that the name of existing ICAs in the source protection plan be replaced to align with the amended terminology in the 2021 Rules so that IPZ-ICAs are used for issue contributing areas related to surface water sources and WHPA-ICA for issue contributing areas related to groundwater sources.

When an ICA is delineated, a list of threat activities that contribute to the issue is to be provided in the assessment report. Appendix A lists threats for the most common issues identified in the first round of planning. If an issue is not included in this appendix, the local authority is requested to contact the ministry to develop an associated list for that issue. In addition, Director's approved local threats circumstances contributing to the issue referenced in appendix A is to be added to the list of threat activities while updating or amending the assessment reports.

Given the new naming convention for ICAs, the WHPA-F identifier is no longer valid. The WHPA-F would be replaced with WHPA-ICA (surface water-based), where the IPZs delineation Rules guide its delineation without a vulnerability score lens. WHPA-F was initially required where a WHPA-E was delineated, and activities contributing to the issue at the well were located beyond the existing WHPAs. Rationale and evidence supporting the delineation of a WHPA-ICA continue to be required in the assessment report. For example, suppose the local authority has information showing that activities contribute contaminants beyond the WHPAs and are transported through surface water bodies. In that case, a WHPA-ICA can be delineated to capture this source.

3-5 Intake Protection Zones 1, 2 (IPZ-1, IPZ-2) – R62.1 and R87:

IPZ-1 is delineated using a fixed radius around the intake and can not exceed the maximum radius. R62.1 has been amended to enable the extension of the setback of IPZ-1 on land and allow the

inclusion of surface water features (e.g. transport pathways) within the maximum radius. The definition of transport pathways in the 2017 Rules applies to all IPZs. R62.1 does not require revisiting all existing IPZ-1 delineations unless existing information indicates the presence of surface water features that may increase the vulnerability of IPZ-1 to contamination, subject to local authority discretion/professional judgement.

Amended R87 addresses situations where an IPZ-2 is very large. The Rules do not prescribe an approach for dividing an IPZ-2 into sub-areas, as this depends on the local characteristics and settings of the drinking water sources. However, the criteria for dividing IPZ-2 into sub-zones could be, for example, based on the slope of the land (steep vs. flat), type of soil (sand vs. silt), or time of travel intervals (30 mins, 60 mins). A multi-score concept would more appropriately reflect the variation of the land characteristics (land slope, permeability, transport pathways, etc.) used to determine the travel time to the intake.

R87 does not require revisiting all existing IPZ-2 scores. Revisiting IPZ-2 scores may identify new risks to drinking water sources as the sub-divided IPZ-2 may yield vulnerability scores that better reflect the local land characteristics. However, if all the new IPZ-2 vulnerability scores would not result in drinking water threats being identified as "significant," the local authority may choose not to sub-divide IPZ-2 and retain one IPZ-2 with one score.

3-6 Surface Water-Groundwater Connection (connection) – R49 and R49.1:

In previous versions of the Rules, connection identification relied solely on the Groundwater Under the Direct Influence of Surface Water (GUDI) framework under the *Safe Drinking Water Act* (i.e. pathogen driven). Where this connection is identified, the Rules triggered the delineation of a WHPA-E (surface water-based) to capture activities that contribute pathogens to the source water at a well. However, the original purpose of WHPA-E is to capture activities contributing to both pathogens and chemicals through this connection. Therefore, R49 was amended to remove reference to the GUDI procedure to focus on the surface water-groundwater connection.

Under R49, the local authority will need to demonstrate this connection by characterizing the hydrogeological/geological settings, geoscience technical studies, water quality data, etc. That means that the study would have the settings that demonstrate whether there is a connection. For example, connections would typically be part of the hydrogeological assessment completed to bring a new municipal well into service (e.g., Permit to Take Water application). The connection may occur or be enhanced when an operating well draws groundwater and surface water. Typically, an assessment of hydraulic connection relies on the field methods, including pumping tests and analysis (e.g., recharge boundary effects, recovery characteristics, etc.) and an assessment of vertical and lateral hydraulic gradients and flow directions under pumping conditions and with consideration of seasonal effects. However, local authorities may know surface water bodies further afield that could contribute enough persistent chemicals (e.g., chloride, sodium, nitrate, etc.) to

groundwater quality at a well and thus may also warrant assessment. Therefore, it is important to assess the potential for hydraulic connections up to WHPA-B.

If the connection is found and there is insufficient evidence that the connection may adversely affect the quality of drinking water at the well, the WHPA-E will not be required (R49.1). R49 and R49.1 are intended to apply moving forward, i.e. new WHPA-Es. However, it is the local authority's discretion to revisit all existing WHPA-Es identified in the assessment reports.

3-7 Local Threat – R119:

R119 was amended to avoid duplication in efforts between provincial/federal regulations. The intent of the local threats is to address local situations that pose a risk to a drinking water source, a specific drinking water system, or a specific protection zone. They are not intended to regulate activities where they are already regulated under provincial or federal site-specific approval. For this reason, the Rule was amended to disqualify activities from R119 where the activity is subject to an approval requirement under federal or provincial law.

If the local authority is aware of a local drinking water activity that is already regulated by provincial or federal law, and that in the opinion of the local authority there is a gap in managing its drinking water risk through the provincial or federal law, they can bring this to the ministry's attention with a rationale for why the activity needs to be listed as a local threat in the assessment report. The Director will determine whether existing provincial or federal laws can regulate the drinking water threat activity in question. If further actions are necessary, the activity may be identified as a prescribed threat under the O.Reg. 287/07 (e.g. hydrocarbon pipeline). For other non-regulated provincial/federal activities, the local authority may submit a request to the Director to identify the activity in question as a local threat under R119, subject to the Director's review and decision.

Local threats approved before the 2021 Rules were released are not impacted by the amended R119.

3-8 Contaminated Sites / Conditions – R139 and R141:

The 2017 Rules clarified that the intent of significant groundwater recharge areas (SGRAs) was to identify areas vulnerable to water quantity risks. With this in mind, R126 was amended in 2017 to remove references to SGRAs for water quality threats related to conditions. Thus, where conditions were identified in SGRAs, they are no longer water quality threats. Conditions can only be identified in water quality protection zones (e.g. IPZs, WHPAs, or HVAs).

Generally speaking, a condition is identified as an underground plume of contaminant(s). The Rules to identify conditions focus on identifying contamination at the site and whether the plume is migrating and can potentially impact the water quality of the source of drinking water.

R139 and R141 were amended to clarify the intent of the term "off-site contamination" previously used in the 2017 Rules. Conditions are generally identified as plumes of

contaminants regardless of the property boundary. When the property on which the contamination originated is known, the local authority can use the property boundary to identify the contamination is migrating outside the property, i.e. similar approach used previously with the term off-site contamination. In other situations, where data is not sufficient to identify the origin of the contamination, evidence would be needed to demonstrate that the plume of contamination has the potential to move towards the well or intake. In this case, the local authority is encouraged to use available information to identify the property(ies) that caused the contamination.

Concerning the term 'evidence' in R139 and R141, read this in conjunction with the second part of sub-rule (1) of R139 or sub-rule (4) of R141, which refers to the potential of the condition to deteriorate water quality. Evidence could include, but is not limited to, situations where:

- the condition is impacting the operation of the well (for example, running at a lower pumping rate or shut down, etc.),
- the plume of contamination is observed to be migrating towards a well or intake at a concentration that may impact the operation of the well/intake (e.g. moving from WHPA-B to A or from IPZ-2 to IPZ-1, etc.), or
- the plume of contamination is not stable (e.g. where equilibrium has not been achieved) or is observed to be increasing over a period of time as demonstrated by groundwater transport modelling and groundwater monitoring data support that.

If there's no clear evidence of how contamination is migrating to the well/intake, the condition would not be a significant drinking water threat in accordance with R139(3), and R141 would not apply.

Information about the movement of contaminants along with other considerations of the current status of the condition (e.g. stable, decreasing, etc.) can also be used by the local authority to re-assess the condition and determine whether it would still be considered a significant threat. That re-assessment could result in a decision to amend the plan and either remove the condition or revise the risk level of the condition.[2]

[2] Additional Notes:

- To meet the legal test of s. 22 (2) 2 ii of the Act, which requires that a significant threat policy ensure that an existing significant drinking water threat ceases to be significant, the management and/or monitoring of the contaminated site may be adequate. That does not mean that the circumstances that define the risk have changed but rather that the site is being managed.
- The Records Of Site Condition regulation made under the *Environmental Protection Act* (O. Reg. 153/04) sets out the requirements for environmental site assessments and records of site conditions for contaminated sites, also known as brownfields. Where a Risk Assessment and/or Certificate of Property Use is issued for a condition site under O. Reg. 153/04, these documents may describe the risk management measures to contain contaminants on the site. In addition, the local authority can report on the management of the significant condition in their annual progress report.

4-Amendments governing the Tables of Drinking Water Threats (Part XII of the Rules)

The Tables of Drinking Water Threats (Tables) have been merged with the 2021 Rules (Part XII) to simplify identifying the threat and associated circumstances. This new structure allows for an easier and more focused search to identify risks associated with each prescribed threat. Key features include:

- Alignment of the threats number with the numbering system in the Act and Regulation 287/07.
- Inclusion of 'C' and 'P' to the circumstance numbering system represents whether the circumstance is either chemical or pathogen.
- Combining the threat sub-categories of handling and storage for the same threats to recognize their combined risks on property.
- Reformatting the circumstances to remove chemicals showing where threats can pose risks; however, chemicals associated with circumstances were embedded in calculating the hazard ratings for each activity.
- Displaying both chemical and pathogen circumstances associated with a threat sub-category in the same table.
- Listing the threat activities associated with the most common drinking water issues to support identifying significant drinking water threats in ICAs (see appendix A).

The sub-sections below summarize the changes made for specific threat sub-categories. Threats and circumstances not included in these sub-sections remain unchanged from the previous versions of the tables. The threat sub-category is referred to in the following sections as "# [threat number]." This reference number can be found in Part XII of the Rules.

4-1 Added threat sub-categories:

The threats sub-categories included under this section are:

i. *Application of processed organic waste (POW) to land (threat # 1.2) and storage of POW or waste biomass (threat # 1.9):*
   To better align the threat categories with the provincial management frameworks, new threat sub-categories have been added:
   - the land application of POW
   - the storage of POW and waste biomass.

   POW material is the organic waste residue remaining after sewage treatment plant processing and is similar to a category 3 non-agricultural source material (NASM). Under the provincial management frameworks, the land application and storage of POW are subject to an Environmental Compliance Approval (ECA) under the *Environmental Protection Act* (EPA) when applied on non-agricultural land. When POW is applied on agricultural land as NASM, land application and storage are subject to the *Nutrient Management Act* (NMA). Where POW is

stored on an agricultural property for disposal and does not meet the category 3 land application requirements under the NMA, the POW storage and disposal would be subject to the EPA. POW can either be disposed of in municipal landfills or applied to sites that are not municipal landfills. Like the nutrient application threats, the risks related to POW application are determined based on the percentage of managed land and livestock density for the area.

Waste biomass is the organic matter derived from a plant or animal available on a renewable basis, as defined under O. Reg. 347 under the EPA. It is similar to several NASM materials. The generation and storage of waste biomass off-farm are subject to the EPA unless sent to an anaerobic digestion facility defined in Section 3(1) 14 of O. Reg 347. When the waste biomass is applied on agricultural land as NASM, the land application and storage are subject to the NMA. If the waste biomass is not sent to anaerobic digestion facilities but rather disposed of, this material is considered municipal waste and disposed of in municipal landfills.

The risks associated with the storage of POW or waste biomass are calculated based on the mass of nitrogen as a surrogate for nitrate and the type of storage (i.e. at, above, or below grade). Threats under the POW, application and storage sub-categories can be addressed by prescribed instrument (PI) policies. The ministry has been and will continue to consider the protection of drinking water sources when reviewing, issuing and reporting on applications for ECAs for POW, regardless of whether plan policies for NASM specify that they also apply to POW. Local authorities should review their NASM policies in their source protection plans to determine whether they have already captured the application and storage of POW. Where such policies do not address the application and storage of POW off-farm, local authorities can choose to amend the existing NASM policies or create new policies for these sub-categories at the next amendment under sections 34 or 36 of the Act.

ii. *Storage of hauled sewage (threat # 1.8):*
This sub-category is mainly associated with stationary storage and does not include septic tanks or septic systems where the sewage is produced before hauling. The risks related to the application of hauled sewage are defined in the threat tables; however, the tables did not capture the risk associated with the stationary storage where the hauled sewage is stored temporarily by haulers where it is not generated or disposed. Therefore, a local authority should consider updating the policies in a source protection plan where needed to reflect these new sub-categories at the time of the next amendment under sections 34 or 36 of the Act.

4-2 Revised existing threat sub-categories:

The following threats have been amended to clarify the risk associated with each threat:

i. *Transfer/processing sites approved to receive hazardous waste or liquid industrial waste (threat # 1.10)* and *Transfer/processing sites approved to receive only municipal waste (threat # 1.11)*[3]*:*

Threat # 1.10 includes sites approved to receive subject waste (i.e. hazardous waste and liquid industrial waste (LIW) defined under Part V of the EPA). Threat # 1.11 includes sites that can only accept municipal waste, including residential, commercial, institutional, and industrial non-hazardous wastes.

Specific quantities are listed in clauses (p), (q), (r), (s), (t), or (u) as exemptions to the definitions of "hazardous waste," and clause (d) of the definition of "liquid industrial waste" in O. Reg. 347 under the EPA. These are known as small quantity exemption (SQE) wastes. The storage of SQE wastes, where generated on-site, was identified as a risk under the 2017 Rules. However, these quantities do not pose a risk at the generating site or facility, but rather when they are accumulated at a municipal waste transfer/processing site (i.e., Threat # 1.11). Therefore, the SQE wastes would not be identified as a risk under threat sub-category # 1.10 because these sites are approved to receive subject wastes; however, under the threat sub-category # 1.11, the storage of SQE wastes would be identified as a risk since they are managed under the municipal waste stream (which are not approved to accept subject waste).

The amended descriptions for the risks associated with these threat sub-categories consider the storage location of the wastes at the transfer/processing sites (i.e., whether the storage is at, above, or below grade).

Refer to section 5 for additional considerations when reviewing Risk Management Plans (RMPs) established to manage the SQE wastes under the 2017 Rules.

ii. *Storage of subject waste at a waste generation facility: site requires generator registration under Section 3 of O. Reg. 347 (threat # 1.12):*

The Waste Management regulation made under the EPA (O. Reg. 347) sets out the provincial waste management framework. It specifies which hazardous waste and LIW generation facilities require ECAs, which facilities require registration, and those subject to other measures. For example:

- All products containing mercury are categorized as "common mercury waste" under O. Reg. 347. Common mercury waste can be transported to a common mercury recovery facility without generator registration or transportation manifests.
- Waste electrical and electronic equipment (widely known as WEEE) that is collected and transported by a hauler to the electrical and electronic equipment (EEE) collection site is managed under O. Reg. 522/20 (Electric and Electronic Equipment) under the *Resource Recovery and Circular Economy Act, 2016*.

[3] Both Threats #1.10 and #1.11 address storage of waste.

Some facilities generating and storing hazardous waste or LIW (i.e., subject waste) do not require an ECA. Instead, they only require registration under the Hazardous Waste Information Network (HWIN). "Subject waste" is a term that refers to hazardous waste (including hazardous waste treated to remove characteristic hazards such as reactivity and ignitability) and LIW that is to be registered with the MECP through the HWIN. The transport of these wastes is to be tracked through HWIN. Therefore, threat sub-category # 1.12 includes storage of commercial, institutional, and industrial facilities at the original generators of subject waste until these wastes have been treated to meet the land disposal treatment requirements (LDRs). This storage does not require an ECA, although O. Reg. 347 includes provisions to manage the temporary storage of subject wastes on these sites. Since these waste generators do not require ECAs, the *Clean Water Act*, *2006* allows local authorities the ability to require Risk Management Plans (RMPs) for these activities. Refer to section 5 for additional considerations when reviewing RMPs established under the 2017 Rules to manage waste storage at generating sites requiring registration.

iii. *Storage of Waste at a Waste Generation Facility: site that is exempt or excluded from generator registration requirements (threat # 1.13):*
Like # 1.12, threat sub-category # 1.13 includes facilities that are the original generators of hazardous wastes or LIW. However, unlike # 1.12, these facilities do not require ECAs or registration under HWIN. The management framework of these wastes is found in other EPA regulations. Since these facilities are the original generators of hazardous wastes or LIW and require neither registration nor an ECA, a source protection plan may include policies that rely on Part IV of the Act to manage or prohibit activities that meet the circumstances for threat sub-category # 1.13. Appendix B provides a list of activities that would meet these circumstances.

The circumstances for threat sub-category # 1.13 do not include the storage of *municipal* waste*;* therefore, they also do not include the storage of SQE waste (as defined above) since SQE waste is managed under the municipal waste stream only. Refer to section 5 for additional considerations when reviewing RMPs established under the 2017 Rules to manage the storage of waste at generating sites that do not require registration.

Notes: Storage of Waste Oil and DNAPLs

- Waste oil is a common waste product that may be found in facilities where subject waste is generated and stored. In some cases, waste oils can include used DNAPL products, and the threat categories for waste disposal and the storage of DNAPLs may appear to overlap. However, the risks related to waste oil and DNAPLs are assessed separately under two different threat categories in the Tables. The threat category for DNAPLs captures unused products only. Once the DNAPL liquid is used and mixed with other chemicals or oils, it becomes waste oil and is considered hazardous waste or LIW. When stored in quantities

above the small quantity exemptions, the storage of used DNAPL products mixed with waste oil is included under the storage of subject waste regulated under O. Reg. 347 (threat sub-category # 1.12).

- However, the circumstances for threat sub-category # 1.13 apply to waste oils produced by retail motor vehicle service stations or service facilities with a written agreement for the collection and management of their wastes with a waste management system that has a waste ECA to haul the hazardous waste or LIW off-site.

Plans are to be revised to reflect the changes to this threat sub-category at the next plan update. Policies to manage significant drinking water threats related to threat sub-categories # 1.12 and # 1.13 can use various tools, including RMPs, specify action, and education and outreach.

iv. *Storm water management facilities and drainage system outfalls (threat # 2.3):*
These facilities receive storm water from contributing areas within geographical areas associated with certain land uses (i.e. commercial, industrial, residential, rural). The quality of the storm water (type of contaminants) depends on the types of land uses that drain into the facility and the size of the impervious surface areas that generate the runoff transported through storm sewers or other transport pathways. Therefore, the circumstances have been amended in the tables to use the percentage of impervious surface areas and the type of land uses to evaluate risks. For this set of circumstances, it is specified that the risk related to storm water management facilities is either the outfall or discharge point of the facility (e.g. storm water management pond) or drainage system (storm sewer discharging to surface water bodies) where it discharges into an IPZ or a WHPA.

The term 'predominant', concerning land use type, has been changed from the previous versions of the tables as it is still relevant to the evaluation of risk associated with this threat sub-category. The local authority can specify the definition of 'predominant' when identifying threats. For example, the local authority may specify that to be considered 'predominant,' a type of land use within the contributing area of storm water area may represent 30-50% or greater of the total contributing area.

Important notes:

- Greenhouses are not included with industrial land uses under the circumstances but rather grouped with agricultural land use.
- The storm water management facilities and drainage system outfalls included in this threat sub-category require ECAs under the EPA and therefore cannot be addressed by policies under Part IV of the Act, meaning that they cannot be managed by RMPs under section 58.

v. *Storm water infiltration facilities (threat # 2.4):*
Similar to threat # 2.3, these facilities are a subset of the storm water management facilities that manage storm water, and they are designed to infiltrate storm

water to the ground (including some types of Low Impact Development (LID) facilities). Therefore, they may pose risks to groundwater (in WHPAs). During extreme weather conditions, these facilities may overflow their designed capacity and discharge to land or exfiltrate storm water through perforated pipes; therefore, they may also pose risks to surface water (in IPZs).

To estimate the quantity of water draining to the facility, the circumstances require the sum of the contributing areas of all infiltration facilities installed on a site to evaluate the risk rather than the contributing area of each infiltration facility. The purpose of the infiltration facilities is to collectively manage the total runoff generated on a site through infiltration and exfiltration together with other types of LIDs (e.g. LIDs that promote storage for evaporation). In principle, infiltration facilities installed on a site or within a specific geographic area work together and can vary in size and contributing areas. Separating and evaluating the risk related to each storm water infiltration component on a site rather than the geographic area would be challenging and would not characterize the risk to groundwater properly.

Facilities identified as threats in this sub-category require ECAs, therefore plan policies only apply to storm water infiltration facilities managed by ECAs. Other infiltration facilities, such as vegetated strips associated with agricultural operations regulated under the NMA and that are not subject to ECAs, are not included in this threat category. Policies to manage significant drinking water threats related to storm water infiltration facilities can use a wide range of tools, including prescribed instruments, specify action, and education and outreach.

vi. *Application of road salt (threat #* 12)*:*

To identify the risk associated with this threat, two components are needed:

1) the thresholds for low, moderate, and significant risks and
2) the grid/area size where the circumstances would apply.

For 1), the circumstances to use lower (new) thresholds have been amended to address situations where the previous thresholds did not identify areas where activities were significant threats, despite the quality of drinking water at the well or intake showing impacts from road salt. These lower thresholds represent the approximate percentage of impervious surface areas in the entire WHPA or IPZ associated with the wells or intakes where road salt had been identified as a water quality concern/issue. These thresholds would apply to all existing and new or expanded drinking water systems; see section 5 for more details.

For 2), sub R16 (11) has been amended to no longer require the use of the 1km x 1km grid to meet the requirement of mapping impervious surface areas. The requirements were removed for using this grid size because, in some situations, it did not accurately identify the areas where road salt posed significant risks.

The rules do not prescribe an approach for choosing the size of the area or sub-area since land characteristics, type of land use, and hydrological settings of the protection zones may vary

from one drinking water system's vulnerable area to another. The amended sub R16 (11) provides the flexibility to the local authority to determine the grid or area size where road salt poses a risk to the quality of water. Grid and area size should be chosen to reflect how various characteristics of the vulnerable areas associated with the drinking water sources would respond to the road salt impacts. For example, the area size could include the entire vulnerable area (i.e. IPZ-1, IPZ-2, or WHPA-A, WHPA-B) that has a single score or the areas that have the same land characteristics (slope, type of soil, etc.) within a vulnerable area. If the local authority chooses to change the 1km x 1km grid to a new grid or a size of an area, the assessment report has to include a description and rationale of the approach chosen.

Under sub R16 (11), a local authority can keep the existing 1km x 1km grid as shown in the assessment reports where, for example:

- the existing grid is sufficient to identify road salt concerns/threats, or
- the threat activity is already identified through other approaches (e.g. ICA), and therefore a different grid /area size will not add a benefit, or
- the vulnerability score(s) of the vulnerable area is not high enough to identify significant threats regardless of the grid/area size.

The new thresholds could still apply within the existing 1km x 1km grid despite the above. The term "impervious areas" used in the circumstances refers only to the areas where road salt is applied, i.e. does not include roofs or backyards.

vii. *Handling and Storage of Road Salt (threat # 13):*

Similar to the threat category for the application of road salt, the quantity thresholds associated with identifying threats related to storage and handling of road salt were not suitable to identify significant risks in all situations. These thresholds didn't account for many areas (parking lots, commercial plazas, etc.) storing smaller quantities of road salt where road salt had been identified as a water quality concern/issue. The circumstances were amended for this threat to account for three types of road salt storage based on their exposure to precipitation. Those are: uncovered storage (full exposure), partially covered storage (potential exposure), and covered storage (very limited to no exposure). The circumstances listed under threat # 13 describe the differences between these.

- For uncovered storage (# 13.1), the minimum quantity threshold for significant threats is 10kg depending on the vulnerable area scores. This quantity represents the average size of storage of road salt in residential, small retail plazas, parking lots, and small yards.
- For partially covered storage (# 13.2), the minimum quantity threshold is 100kg, which represents the average size of containers stored at mall parking lots or other large parking lots or yards.
- For covered storage (# 13.3) inside an area, facility, or structure where the storage or (un)loading is roofed, walled, with an impermeable floor, since they have a very low

likelihood of contributing contaminants to the drinking water sources they would not be identified as significant threats using vulnerability scores. However, they may be identified as significant threats where they are located in ICAs associated with salt issues where the circumstances are met.

Because of the lower thresholds, new areas where significant threats for threat categories # 12 and # 13 could occur may be identified. The local authority can choose to address these newly identified areas using the same or different policy approaches/tools previously used to manage these threat sub-categories in their plan. For example, where a plan includes a prohibition policy for a specific quantity of road salt based on the old threshold, the authority may choose to keep that policy and develop new policies to either prohibit or manage smaller volumes. Policies to manage significant drinking water threats related to road salt can use various tools, including RMPs, specify action, and education and outreach.

viii. *Storage of snow (threat # 14):*

The snow storage threat category includes a snow disposal facility or disposal area designed to receive snow for retention and control or further discharging or infiltrating the meltwater to ground, land, surface water, or sewage works. Snowbanks or ploughed snow in residential areas are not included.

The storage of snow below grade was removed as a circumstance for this threat category since this type of storage hasn't been identified anywhere in Ontario. Additionally, the surrogates used to assess the risk associated with the storage of snow are based on the most common contaminants found in the accumulated snow from specific land use (e.g. commercial or industrial), as well the size of the area where snow is stored. The approach used to quantify the size of the area where stored snow poses a risk to drinking water is similar to the storm water infiltration facilities (threat # 2.4) threat sub-category for consistency. For the use of the term 'predominant,' refer to section 4-2(iv) above.

Storage of snow designed to discharge to the environment requires an ECA. The outfall from the snow disposal facility represents the risk to sources of drinking water. Where an ECA is required, plan policies cannot use either section 57 prohibition or section 58 risk management plan to address this activity.

Other policy tools may be used for the storage of snow that does not require an ECA. Risk management officials (RMO) can use Access Environment Ontario to determine whether a stormwater management ECA exists for a site. For example, that could be done by zooming in on the area where significant risks can exist and extracting the ECAs within that area only. If a stormwater management ECA does not exist for a site, the RMO may investigate further to determine whether the activity requires an RMP.

ix. *Handling and storage of fuel (threat # 15):*

The two sub-categories of handling and storage of fuel have been merged into one set of circumstances since they happen hand in hand on a property. Part XII.1 (glossary) of the Rules clarifies that storage of fuel includes the handling process associated with the storage although they may not necessarily take place at the same grade level of the property, hence the water quality risks of storage and handling may be different. For example, where the storage is below grade, and the handling takes place above grade, each handling and storage risk is assessed using the below and above grade circumstances, respectively. Additionally, the circumstances have been revised to recognize the risk related to the above grade handling and storage of fuel in quantities of 250L or greater in a groundwater protection zone (WHPA) with a vulnerability score of 10.

The evaluation of the risk associated with this threat activity is focused on permanent tanks/structures where fuel is stored. This includes trucks used as fuel filling stations and does not include mobile containers. However, when temporary containers can stay for an extended period (years), the local authority/municipality can follow the same approach used in the first round of planning for consistency.

The risk associated with this threat is usually determined by the size of a single tank on the site; however, if there is clear evidence that a spill of fuel may occur simultaneously from multiple tanks on the site, then the total storage of these tanks, as one volume, should be used in assessing the risk. In this case, the plans should include an explanation.

When updating plans, policies that used general language, such as "policy applies where the threat is significant," would not require a change to address new threats due to the new thresholds. However, where existing policy wording specifies the storage size, the policy would need to be revised, or an additional policy could be developed to address the new circumstances.

4-3 Clarified existing threat sub-categories:

The threats addressed in this section remain the same as in the existing 2017/2018 tables of threats; however, the circumstances have been amended to clearly identify the parts, facilities, and structures associated with the activities that pose a risk to sources of drinking water.

i. *Wastewater collection facilities and associated parts*:
   - Sanitary Sewers (*threat # 2.5*): explicitly identify the forcemain or rising main as the facilities that pose a higher risk.
   - Outfalls (*threat # 2.6*): identify the facilities posing risks, e.g. discharge of a combined sewer overflow or sanitary sewer overflow from a manhole or sanitary sewage pumping station overflow from a wet well.
   - Sewage pumping station/lift station from a wet well and holding tank or a tunnel: (*threat # 2.7*): risks associated with the leakages to groundwater and surface water.

ii. *Wastewater treatment facilities and associated parts (threat # 2.8)*:
The circumstances to separate the following sub-categories have been amended:
- Effluent (including bypass) overflow from the sewage treatment plant.
- Sewage lagoon as a wastewater treatment facility where a discharge to groundwater may occur.
- Process and holding tanks associated with the wastewater treatment facility that may discharge or spill to groundwater or surface water.

iii. *Application of NASM to Land (threat # 6) and storage of NASM (threat # 7):*
Circumstances for these threats now explicitly list the type of NASM categories that pose a risk to water quality and align with recent amendments to the NMA. These categories are:
- category 1 NASM (non-farm herbivorous animals only),
- category 2 (material listed in Schedule 4, Table 2 of O. Reg. 267/03. For example, organic waste matter containing no meat or fish and is derived from food processing at a bakery, etc.), and
- category 3 (material listed in Schedule 4, Table 3 of O. Reg. 267/03. For example, pulp and paper biosolids, etc.).

The application and storage of material from non-farm herbivorous animals (category 1 NASM) does not require NASM plans, unlike categories 2 and 3. Where this activity is identified as a significant threat, local authorities may develop plan policies to address the activity through other tools, including RMPs or education and outreach. Definitions for these NASM categories are provided in the glossary section in Part XII.1 of the Rules.

iv. *Handling and storage of commercial fertilizer (threat # 9)*:
The circumstances for this threat have been simplified to focus on the sites where handling and storage of fertilizer may occur. These sites include but are not limited to retail, wholesale, manufacturing facilities, and storage associated with the application of commercial fertilizer. Also, the circumstances include liquid, solid, powder, or any other forms of commercial fertilizer. Mixing and mobilising of commercial fertilizer within a property are identified as threats under the handling sub-category while transporting fertilizer off the property on roads or highways is not included under this threat sub-category.

v. *Handling and storage of pesticides (threat # 11):*
The circumstances related to the type of storage and material form used to describe the handling and storage of pesticides have been clarified to be consistent with those of the handling and storage of commercial fertilizer. The quantity thresholds or the vulnerability scores have not changed.

vi. *Handling and storage of DNAPL (threat # 16):*
The circumstances have been amended to identify DNAPL activities as significant drinking water threats in IPZs scored 9 and 10 instead of only those scored 10. The

tables now recognize that DNAPL chemicals with a high toxicity rating may impact surface water bodies where new areas where significant threats could occur may be identified.

Additionally, a list of activities (List 1), adapted from O. Reg. 153/04 (Records of Site Conditions, also known as the brownfields regulation) where DNAPLs may be stored or handled as part of their operations, have been added. The list of activities is intended to be used to identify activities that likely use DNAPLs instead of attempting to identify specific liquids that exhibit DNAPL characteristics and behaviour in the environment.

List 1 is meant to be used as a guide for the local authority, and its use is optional. The list can be used, in addition to the methods and the local knowledge that were originally used by the local authority to identify significant drinking water threats related to DNAPLs. The list does not limit the local authority from adding other activities to their local list of DNAPL activities. The list is not intended to change the policy approaches implemented in the first round of planning.

Refer to section 4-2 (iii) above to understand the differences between risks associated with waste oil and DNAPL storages.

4-4 Editorial changes to threat sub-categories:

i. *Conveyance of a liquid hydrocarbon by a pipeline (threat # 22)*:
The name of the *National Energy Board Act* has been replaced with *Canadian Energy Regulator Act* to align with the name change in that Act in 2019. This change does not affect the risk scores nor the circumstances describing the risk. Also, a definition of liquid hydrocarbon is provided in the glossary of Part XII.1 of the Rules to align with the definitions of pipeline in other provincial regulations and ensure consistency with the previous Director's letters approving local threats for pipelines.

5-Incorporation and implementation of the 2021 Rules

The purpose of this section is to discuss the incorporation of the 2021 Rules into assessment reports and source protection plans, as well as how these changes can be implemented.

5-1 Updating assessment reports and source protection plans:

Local authorities can revise source protection plans and assessment reports to incorporate the 2021 Rules using one or more of these methods:

- an amendment under section 51 of O. Reg. 287/07 for changes in terminology
- a locally initiated amendment under section 34 of the Act
- an update resulting from the review under section 36 of the Act

The most appropriate method depends on factors such as whether the local authority has already completed their Plan review under section 36, whether they have a section 34 amendment underway, and whether any of the changes to the Rules impact their Plans. In all cases, the Plans

should indicate which version of the Rules applies to a particular amendment or section of an updated assessment report or source protection plan.

i. *Amendments under section 51:*
In 2018, changes to O. Reg. 287/07 allowed this type of amendment to Plans to address changes in terminology used in the Tables of Drinking Water Threats (see subsection 51 (1), paragraph 9). If an amendment is made under section 51, the SPA will publish the amendment and a notice describing the amendment on the internet as soon as reasonably possible after the amendment is made. The SPA will also give a copy of the notice to the Director and every person or body responsible for implementing a policy affected by the amendment and provide updated geospatial mapping data to the ministry (where applicable). The SPA will record the rationale for the amendment and keep it on file.

ii. *Amendments under section 34:*
Section 34 amendments are typically those with some urgency, usually to address new or changing municipal sources of drinking water. Local authorities may choose this method to incorporate the 2021 Rules into their Plans if they have already completed their plan review under section 36 or if they are in the early stages of preparing an amendment under section 34 and including these additional changes would align with that work. When updating the assessment report, any new work included in the report will be subject to the Rules in effect at the time of the update (including the Tables of Drinking Water Threats).

If a locally initiated amendment is proceeding under section 34 of the Act for a specific purpose before the completion of their Plan updates under section 36, such as to include a new or changing drinking water system, local authorities may want to amend other sections of their plan to incorporate the 2021 Rules if they feel those changes are necessary at the time of the amendment. It is advisable for the local authority to consider the impact of using two or more versions of the Rules in an area that would be subject to source protection plan policies. For example, if you add a new intake protection zone, and you add the activities that would be significant drinking water threats according to the 2021 Rules, you may have activities such as the application or storage of road salt identified as significant in the new vulnerable area, but not in other vulnerable areas. Therefore, the local authority may decide to revise the entire plan to incorporate that aspect of the 2021 Rules, depending on the timelines for their plan updates under section 36.

The local authority can choose to make revisions under section 51 alone or in combination with an amendment under section 34 or 36 of the Act, depending on which aspects of the 2021 Rules impact their Plans. For example, simple changes to terminology in Plans could be made immediately, and more complex changes included in an amendment under section 34. Local authorities may also choose to update their source protection plan to incorporate the 2021 Rules through a series of amendments under section 34, rather than a single amendment, to

prioritize any items that should be addressed quickly.

iii. *Amendments under section 36:*
Updates to the plans made under section 36, including those required by the Minister's order and any additional updates by the local authority, are to align with the Rules in effect at the time of the updates. Local authorities should review the changes to the Tables of Drinking Water Threats (see section 4 above) and assess which changes to the Rules affect their updates.

Where a local authority has already completed a review of their plan under section 36, they should assess the work needed to align their plans with the 2021 Rules. Local authorities can then develop one or more amendments under section 34 to distribute the work over time, starting with the highest priority changes. If the authority determines that only terminology changes are necessary to align with the Rules, those changes can be made under section 51 of O. Reg. 287/07.

If the 2021 Rules take effect while the local authority is nearing completion of their updates under section 36 (i.e. have completed or nearly completed a consultation on these updates), they can choose to align their updates with the 2021 Rules, or complete them "as is," and make the remainder of the changes as an amendment. The local authority is encouraged to discuss this with the ministry before making this decision.

5-2 Ministry review of environmental compliance approvals and environmental assessments:

When reviewing applications for new environmental compliance approvals (ECA) or amendments to existing ECAs, the ministry applies the Rules in effect at the time the application is received whether or not the source protection plan has been updated to reflect the 2021 Rules. The ministry developed Standard Operating Policies (SOPs) to implement source protection plan policies related to sewage and waste and provide minimum design and operational standards and considerations to mitigate risks to sources of drinking water. A summary of the SOPs was posted on the Environmental Bill of Rights Registry (EBR) in 2014. These documents are available by searching the current Environmental Registry of Ontario (ERO) website using the search tool, using ERO #012-2968.

The ministry also reviews documents submitted through various processes under the *Environmental Assessment Act* and applies the Rules in effect at the time the documents are submitted.

5-3 2021 Rules and source protection plan policies:

Local authorities need to assess the impact of changes to the Rules on their threat enumeration and policies. This includes determining whether activities that were significant under the 2017 Rules will continue to be significant under the 2021 Rules. For example, some occurrences of the waste disposal threat sub-categories are no longer significant drinking water threats (certain types of waste (including subject waste) stored at or above grade at a waste generation facility). Some of

these wastes were previously identified as the small quantity exemption hazardous waste sub-category (SQE wastes) described above. This means that policies in source protection plans that address the previous SQE hazardous waste sub-category may need to be reviewed, revised or removed. In addition, since prohibition is the most restrictive policy outcome available under the Act, as per ss.40 (2), para 2, of O.Reg. 287/07, the committee is to include a rationale in the explanatory document to justify why it was selected for a particular threat activity. Similarly, given education and outreach is the least restrictive policy approach, where it is the only policy tool used to address a significant drinking water threat, as per ss.40 (2), para 6, of O.Reg. 287/07, the committee is to include supporting rationale in the explanatory document.

i. *Part IV policies and RMPs:*
Since certain activities may no longer be significant drinking water threats under the 2021 Rules, local authorities and RMOs need to work together to consider how these changes may impact existing and future RMP holders. This includes identifying any existing RMPs that may need to be amended or revoked. RMOs do not need to wait for the plans and assessment reports to be amended before revoking or amending RMPs that are no longer required under the 2021 Rules.[4] In addition, RMOs should not issue new RMPs for an activity that is no longer a significant drinking water threat under the 2021 rules, even if it is identified as one in the current plan.

Note: RMOs cannot amend or establish RMPs for activities that become new significant threats because of the 2021 Rules until after the plan itself has been amended to align with the Rules, and it takes effect.

ii. *RMPs and registered/unregistered waste:*
With respect to identifying facilities that meet the circumstances for threat sub-categories # 1.12 and # 1.13, RMOs may consult the Hazardous Waste Information Network (HWIN) registry to identify facilities that are registered. The RMO could then inspect and ask whether the generator has an ECA. An ECA is required for a facility that generates subject waste if the subject waste is stored for more than 24 months, regardless of the amount of subject waste stored, whether the facility has the same owner as a waste management system, or whether waste management is a primary function of the site. Threat sub-category 1.12 doesn't include landfills and transfer sites; those facilities require ECAs and are included in separate threat sub-categories. As a reminder, RMOs may only establish risk management plans for activities that *do not* require ECAs.

[4] While there is no provision in the *Clean Water Act, 2006*, that explicitly addresses an RMO's powers to revoke RMPs, section 49 of the *Legislation Act, 2006*, does include such a provision for all instruments ("documents") made under an Act in Ontario. Therefore, s.49 of the *Legislation Act* is what gives RMOs the legal authority to revoke RMPs (instruments), where deemed necessary.

6-Additional notes

Where new drinking water threat policies are included in source protection plans as a result of the 2021 Rules, local authorities are reminded to include monitoring policies if and where appropriate. Where existing drinking water threat policies are revised due to the 2021 Rules changes, local authorities should also review accompanying monitoring policies, if any, to ensure they still identify what is to be reported on by implementing bodies.

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Appendices

Appendix A: Threats activities contributing to common drinking water issues:

Threat Sub-Category	Quantity threshold for significant threat
Parameter: Chloride	
2.1 Industrial Effluent Discharges	Any quantity for IPZs/WHPA-Es and WHPAs
2.3 Storm Water Management Facilities and Drainage Systems: Outfall from a Storm Water Management Facility or Storm Water Drainage System	Any quantity for IPZs/WHPA-Es and WHPAs
2.4 Storm Water Management Facilities and Drainage Systems: Storm Water Infiltration Facility	Any quantity for IPZs/WHPA-Es and WHPAs
12.1 Application of Road Salt	Any quantity for IPZs/WHPA-Es and WHPAs
13.1 Handling and Storage of Road Salt - Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
13.2 Handling and Storage of Road Salt - Potentially Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
13.3 Handling and Storage of Road Salt – Not Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
14.1 Storage of Snow on a Site	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Nitrogen	
1.1 Disposal of Hauled Sewage to Land	Any quantity for IPZs/WHPA-Es and WHPAs
1.2 Application of Processed Organic Waste to Land	Any quantity for IPZs/WHPA-Es and WHPAs
1.4 Landfilling (Hazardous Waste or Liquid Industrial Waste)	Any quantity for IPZs/WHPA-Es and WHPAs
1.5 Landfilling (Municipal Waste)	Any quantity for IPZs/WHPA-Es and WHPAs
1.8 Storage of Hauled Sewage	Any quantity for IPZs/WHPA-Es and WHPAs
1.9 Storage of Processed Organic Waste or Waste Biomass	Any quantity for IPZs/WHPA-Es and WHPAs
1.14 Storage, Treatment and Discharge of Tailings From Mines	Any quantity for IPZs/WHPA-Es and WHPAs
2.1 Industrial Effluent Discharges	Any quantity for IPZs/WHPA-Es and WHPAs
2.2 Onsite Sewage Works	Any quantity for IPZs/WHPA-Es and WHPAs
2.3 Storm Water Management Facilities and Drainage Systems: Outfall from a Storm Water Management Facility or Storm Water Drainage System	Any quantity for IPZs/WHPA-Es and WHPAs
2.4 Storm Water Management Facilities and Drainage Systems: Storm Water Infiltration Facility	Any quantity for IPZs/WHPA-Es and WHPAs
2.5 Wastewater Collection Facilities and Associated Parts: Sanitary Sewers	> 250 m3/day for IPZs/WHPA-Es Any quantity for WHPAs
2.6 Wastewater Collection Facilities and Associated Parts: Outfall of a Combined Sewer Overflow (CSO), or a Sanitary Sewer Overflow (SSO) from a Manhole or Wet Well	Any quantity for IPZs/WHPA-Es > 250 m3/day for WHPAs

2.7.1 - 2.7.5 Wastewater Collection Facilities and Associated Parts: Sewage Pumping Station or Lift Station Wet Well	> 250 m3/day for IPZs/WHPA-Es Any quantity for WHPAs
2.7.6 - 2.7.10 Wastewater Collection Facilities and Associated Parts: a Holding Tank or a Tunnel	> 250 m3/day for IPZs/WHPA-Es Any quantity for WHPAs
2.8 Wastewater Treatment Facilities and Associated Parts	Any quantity for IPZs/WHPA-Es and WHPAs
3.1 Application of Agricultural Source Material (ASM) to land	Any quantity for IPZs/WHPA-Es and WHPAs
4.1 Storage of Agricultural Source Material (ASM)	Any quantity for IPZs/WHPA-Es and WHPAs
6.1 Application of Non-Agricultural Source Material (NASM) to land	Any quantity for IPZs/WHPA-Es and WHPAs
7.1 Handling and Storage of Non-Agricultural Source Material (NASM)	Any quantity for IPZs/WHPA-Es and WHPAs
8.1 Application of Commercial Fertilizer to Land	Any quantity for IPZs/WHPA-Es and WHPAs
9.1 Handling and Storage of Commercial Fertilizer	Any quantity for IPZs/WHPA-Es and WHPAs
21.1 Agricultural Source Material (ASM) Generation - Livestock Grazing or Pasturing	Any quantity for IPZs/WHPA-Es and WHPAs
21.2 Agricultural Source Material (ASM) Generation - Outdoor Confinement Area (OCA) or Farm Animal Yard	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Phosphorus (total)	
1.1 Disposal of Hauled Sewage to Land	Any quantity for IPZs/WHPA-Es and WHPAs
1.2 Application of Processed Organic Waste to Land	Any quantity for IPZs/WHPA-Es and WHPAs
1.8 Storage of Hauled Sewage	Any quantity for IPZs/WHPA-Es and WHPAs
1.9 Storage of Processed Organic Waste or Waste Biomass	Any quantity for IPZs/WHPA-Es and WHPAs
2.1 Industrial Effluent Discharges	Any quantity for IPZs/WHPA-Es and WHPAs
2.2 Onsite Sewage Works	Any quantity for IPZs/WHPA-Es and WHPAs
2.3 Storm Water Management Facilities and Drainage Systems: Outfall from a Storm Water Management Facility or Storm Water Drainage System	Any quantity for IPZs/WHPA-Es and WHPAs
2.4 Storm Water Management Facilities and Drainage Systems: Storm Water Infiltration Facility	Any quantity for IPZs/WHPA-Es and WHPAs
2.5.1 - 2.5.5 Wastewater Collection Facilities and Associated Parts: Force main or Rising Main	> 250 m3/day for IPZs/WHPA-Es Any quantity for WHPAs
2.5.6 - 2.5.10 Wastewater Collection Facilities and Associated Parts: Gravity Sanitary Sewer	> 250 m3/day for IPZs/WHPA-Es > 250 m3/day for WHPAs
2.6 Wastewater Collection Facilities and Associated Parts: Outfall of a Combined Sewer Overflow (CSO), or a Sanitary Sewer Overflow (SSO) from a Manhole or Wet Well	Any quantity for IPZs/WHPA-Es > 1000 m3/day for WHPAs
2.7.1 - 2.7.5 Wastewater Collection Facilities and Associated Parts: Sewage Pumping Station or Lift Station Wet Well	> 250 m3/day for IPZs/WHPA-Es > 250 m3/day for WHPAs
2.7.6 - 2.7.10 Wastewater Collection Facilities and Associated Parts: a Holding Tank or a Tunnel	> 250 m3/day for IPZs/WHPA-Es Any quantity for WHPAs

2.8.1 - 2.8.5 Wastewater Treatment Facilities and Associated Parts: final effluent outfall or a sewage treatment plant overflow outfall	Any quantity for IPZs/WHPA-Es > 500 m3/day on an annual basis for WHPAs
2.8.6 - 2.8.15 Wastewater Treatment Facilities and Associated Parts: sewage lagoon that does not discharge to surface water, sewage treatment plant process tank or a sewage treatment plant holding tank	Any quantity for IPZs/WHPA-Es and WHPAs
3.1 Application of Agricultural Source Material (ASM) to land	Any quantity for IPZs/WHPA-Es and WHPAs
4.1 Storage of Agricultural Source Material (ASM)	Any quantity for IPZs/WHPA-Es and WHPAs
6.1 Application of Non-Agricultural Source Material (NASM) to land	Any quantity for IPZs/WHPA-Es and WHPAs
7.1 Handling and Storage of Non-Agricultural Source Material (NASM)	Any quantity for IPZs/WHPA-Es and WHPAs
8.1 Application of Commercial Fertilizer to Land	Any quantity for IPZs/WHPA-Es and WHPAs
9.1 Handling and Storage of Commercial Fertilizer	Any quantity for IPZs/WHPA-Es and WHPAs
14.1 Storage of Snow on a Site	Any quantity for IPZs/WHPA-Es and WHPAs
21.1 Agricultural Source Material (ASM) Generation - Livestock Grazing or Pasturing	Any quantity for IPZs/WHPA-Es and WHPAs
21.2 Agricultural Source Material (ASM) Generation - Outdoor Confinement Area (OCA) or Farm Animal Yard	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Sodium	
2.3 Storm Water Management Facilities and Drainage Systems: Outfall from a Storm Water Management Facility or Storm Water Drainage System	Any quantity for IPZs/WHPA-Es and WHPAs
2.4 Storm Water Management Facilities and Drainage Systems: Storm Water Infiltration Facility	Any quantity for IPZs/WHPA-Es and WHPAs
12.1 Application of Road Salt	Any quantity for IPZs/WHPA-Es and WHPAs
13.1 Handling and Storage of Road Salt - Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
13.2 Handling and Storage of Road Salt - Potentially Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
13.3 Handling and Storage of Road Salt – Not Exposed to Precipitation or Runoff	Any quantity for IPZs/WHPA-Es and WHPAs
14.1 Storage of Snow on a Site	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Tetrachloroethylene (PCE)	
2.1 Industrial Effluent Discharges	Any quantity for IPZs/WHPA-Es and WHPAs
16.1 Handling and Storage of a Dense Non-Aqueous Phase Liquid (DNAPL)	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Trichloroethylene (TCE)	
1.4 Landfilling (Hazardous Waste or Liquid Industrial Waste)	Any quantity for IPZs/WHPA-Es and WHPAs

1.5 Landfilling (Municipal Waste)	Any quantity for IPZs/WHPA-Es and WHPAs
1.6 Liquid Industrial Waste Injection into a well	Any quantity for IPZs/WHPA-Es and WHPAs
1.12 Storage of Subject Waste at a Waste Generation Facility: site requires generator registration under Section 3 of O. Reg. 347	Any quantity for IPZs/WHPA-Es and WHPAs
2.1 Industrial Effluent Discharges	Any quantity for IPZs/WHPA-Es and WHPAs
2.6 Wastewater Collection Facilities and Associated Parts: Outfall of a Combined Sewer Overflow (CSO), or a Sanitary Sewer Overflow (SSO) from a Manhole or Wet Well	Any quantity for IPZs/WHPA-Es > 1000 m3/day for WHPAs
2.8 Wastewater Treatment Facilities and Associated Parts	Any quantity for IPZs/WHPA-Es and WHPAs
16.1 Handling and Storage of a Dense Non-Aqueous Phase Liquid (DNAPL)	Any quantity for IPZs/WHPA-Es and WHPAs
Parameter: Pathogens: e.g. *Escherichia coli* (E. coli), total coliform	
1.1 Disposal of Hauled Sewage to Land	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
1.2 Application of Processed Organic Waste (POW) to land	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
1.8 Storage of Hauled Sewage	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
1.9 Storage of Processed Organic Waste (POW)	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.1 Industrial Effluent Discharges	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.2 Onsite Sewage Systems	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.3 Storm Water Management Facilities and Drainage Systems: Outfall from a Storm Water Management Facility or Storm Water Drainage System	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.4 Storm Water Management Facilities and Drainage Systems: Storm Water Infiltration Facility	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.5 Wastewater Collection Facilities and Associated Parts: Sanitary Sewers	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.6 Wastewater Collection Facilities and Associated Parts: Outfall of a Combined Sewer Overflow (CSO), a Sanitary Sewer Overflow (SSO) or Pumping Station Overflow (PSO)	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.7 Wastewater Collection Facilities and Associated Parts: Sewage Pumping Station or Lift Station Wet Well, a Holding Tank or a Tunnel	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
2.8 Wastewater Treatment Facilities and Associated Parts; final effluent outfall or a sewage treatment plant overflow outfall &	Applicable to all IPZs/WHPA-Es and WHPAs-A/B

sewage treatment plant process tank or a sewage treatment plant holding tank	
2.8 Wastewater Treatment Facilities and Associated Parts; sewage lagoon that does not discharge to surface water	Applicable only for WHPAs-A/B
3.1 Application of Agricultural Source Material (ASM) to land	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
4.1 Storage of Agricultural Source Material (ASM)	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
5.1 Management of Agricultural Source Material -Discharge from Aquaculture	Applicable only for IPZs/WHPA-Es
6.1 Application of Non-Agricultural Source Material (NASM) to land	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
7.1 Handling and Storage of Non-Agricultural Source Material (NASM)	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
21.1 Agricultural Source Material (ASM) Generation - Livestock Grazing or Pasturing	Applicable to all IPZs/WHPA-Es and WHPAs-A/B
21.2 Agricultural Source Material (ASM) Generation - Outdoor Confinement Area (OCA) or Farm Animal Yard	Applicable to all IPZs/WHPA-Es and WHPAs-A/B

Appendix B: Activities related to the circumstances of threat sub-category # 1.13

The following wastes are included in threat sub-category # 1.13: Storage of Waste at a Waste Generation Facility: site that is exempt or excluded from generator registration requirements.

from O. Reg. 347 Waste Management:

Hazardous wastes or liquid industrial wastes generated by waste generators that fall under Section 1 (3):

- *Paragraph 1:* Waste from the servicing of motor vehicles at a retail motor vehicle service station or service facility that has a written agreement for the collection and other management of such waste with the owner or operator of a waste management system in respect of which an environmental compliance approval has been issued authorizing the collection and other management of such waste. Note: the storage of waste oils that do not meet the description above falls under the threat sub-category 1.12.
- *Paragraph 2:* Intact waste batteries destined for a waste battery recovery facility.
- *Paragraph 3:* Common mercury waste destined for a common mercury waste recovery facility.
- *Paragraph 4*: Waste electrical and electronic equipment (WEEE) that is intact and is destined for a site at which it is to be processed for the recovery of materials.
- *Paragraph 5:* Printed circuit boards that are waste are intact and are destined for a site at which they are to be processed for the recovery of materials.
- *Paragraph 6: Waste from,*
  - a nursing home under the *Nursing Homes Act*,
  - a home under the *Homes for the Aged and Rest Homes Act*,
  - a home for special care under the *Homes for Special Care Act*,
  - the professional office of a member of the Royal College of Dental Surgeons of Ontario, or
  - the professional office of a member of the College of Physicians and Surgeons of Ontario. O. Reg. 102/07, s. 1 (7).

Hazardous wastes or liquid industrial wastes generated by waste generators that fall under certain paragraphs in Section 3 (2):

The wastes described in subsection 3 (2) were assessed for the risks they may pose to sources of drinking water for the storage of hazardous wastes or liquid industrial waste. The waste described in the following paragraphs is included in threat sub-category # 1.13.

- *Paragraph 1:* Hazardous waste or liquid industrial waste, other than used or shredded or chipped tires, if, the waste is transferred by a generator for direct transportation to a site to be wholly used at the site in an ongoing agricultural, commercial, manufacturing or industrial process or operation that, is used principally for functions other than waste management, and does not involve combustion or land application of the waste, or the waste is neither excess soil, other

than excess soil described in subsection 3 (8) of Ontario Regulation 406/19 (On-Site and Excess Soil Management) made under the EPA, nor processed organic waste from a composting facility, and the waste is transferred by a generator for direct transportation to a site, to be promptly packaged for retail sale to meet realistic market demand or to be offered for retail sale to meet realistic market demand.

- *Paragraph 3:* Residue remaining after the metal is recovered from wire and cable and transferred by a generator for direct transportation to a site at which it will be processed for recovery of metal and plastic using a process that does not involve combustion of the residue or any part of the residue.
- *Paragraph 6:* Pickle liquor transferred by a generator for direct transportation to a site at which it is to be wholly utilized as a treatment chemical in a sewage work that is subject to the Ontario Water Resources Act, a sewage works outside Ontario if the utilization of pickle liquor for this purpose is acceptable to the environmental regulatory authority in the jurisdiction where the sewage works are located, or a wastewater treatment facility that discharges into a sanitary sewer.
- *Paragraph 7:* Solid photographic waste that contains silver, including spent chemical recovery cartridges that contain silver, transferred by a generator and destined for a site at which it is to be processed for recovery of silver.
- *Paragraph 8:* Waste paint or waste coatings transferred by a generator and destined for a site at which the waste is to be used in an ongoing manufacturing process for the production of paint or coatings if the process does not involve combustion of the waste and the paint or coatings that are produced are not used as fuel.
- *Paragraph 10:* Spent activated carbon transferred by a generator for direct transportation to a site at which it is to be used in a process to reactivate activated carbon.
- *Paragraph 13:* Waste that is to be processed and used at the same site where it is generated, if,
- neither the processing nor the use of the waste involves combustion or land application of the waste, and the waste is not PCB waste, soil, or a soil mixture.
- *Paragraph 17*: Waste asphalt pavement transferred by a generator for direct transportation to a site at which it is to be used as construction aggregate, or a site at which waste asphalt pavement is processed for use as construction aggregate and at which no disposal of waste or processed waste takes place.
- *Paragraph 18:* Waste asphalt pavement transferred by a generator for direct transportation to a site at which waste asphalt pavement is stored for use as construction aggregate, if the waste asphalt pavement is stored at least 30 metres away from the nearest watercourse, lake or pond, or there are engineered works in place to prevent the waste from having any adverse effect on any watercourse, lake or pond, and the waste asphalt pavement is stored at a construction area for not more than 120 days, a permanent place of business for a person who is in the business of construction, a pit or quarry for which a permit or license has been issued under the *Aggregate*

Resources Act, a road works yard owned by a municipality or the Crown in right of Ontario, or a place that is at least 100 meters from the nearest dwelling.

- *Paragraph 19:* Waste asphalt shingles transferred by a generator and destined for a site at which they will be used as aggregate or surface layer in the construction of walkways for pedestrian use, roads or parking areas, if, before being used for that purpose, the shingles are processed at a site at which the only processing that occurs is sorting, size reduction and the removal of other wastes from the shingles.

Ministry of the Environment, Conservation and Parks
Conservation and Source Protection Branch

Bulletin: Considering Climate Change Impact on Water Quality under the *Clean Water Act, 2006*.

Date: February 15, 2022

Table of Contents

1- Purpose

The purpose of this bulletin is to help municipalities and source protection authorities (local authorities) who choose to include climate change impacts in assessment reports and source protection plans developed under the *Clean Water Act, 2006* (the Act).

2- Background

Ontario's climate is changing, with more frequent and extreme events such as severe rain, ice and windstorms, prolonged heatwaves, and milder winters. Affected sectors across our economy, local communities, Indigenous communities, and individuals recognize the need to address the impacts of a changing climate.

Climate change can affect hydrological processes such as evaporation, transpiration, condensation, precipitation, runoff, and infiltration. Long-term significant variations in these processes may impact the hydrological characteristics of drinking water sources, including the water level in surface water bodies (e.g. lake levels from storm surges), the aquifer water table variability, and the quality of drinking water sources. To advance our understanding of climate change impacts on our water resources, we need to analyze information and data on existing and future climate trends and their relationship to hydrological processes and water quality.

Hydrological processes are considered in the delineation of the vulnerable areas associated with drinking water sources as outlined in the Director's Technical Rules under the Act (Rules). These vulnerable areas are Wellhead Protection Areas (WHPAs), Intake Protection Zones (IPZs), Highly Vulnerable Aquifers (HVAs), and Significant Groundwater Recharge Areas (SGRAs). They were delineated to identify water quality and quantity risks to municipal drinking water sources as outlined in the local assessment reports, and policies to address these risks are in local source protection plans.

To complement this, Rule 15.3 allows local authorities to consider climate change information, data, and analysis as part of the local assessment report and source protection plan. This is a local decision. If the opinion of the local authority is that the data available is sufficient to undertake a climate risk assessment on the quality of drinking water sources and the results of the assessment conclude that the drinking water system is resilient and/or vulnerable to climate change impacts, then this information can be included in the future updates of local assessment report and source protection plan.

The climate change impact assessment results may inform local discussions and decision-making on how to address climate change impacts. It is important to mention that the climate change impact assessment results do not alter the delineation or the scoring of the vulnerable areas, nor do they affect the risk level of drinking water threats outlined in the local source protection plan and assessment report.

Technical Rule 15.3 reads:

If an assessment report includes a climate change risk assessment in relation to a wellhead protection area or intake protection zone delineated in the assessment report, the following shall be included in the assessment report,

(1) An explanation of why specified climate data sets were used as the basis for the climate change impact assessment;

(2) A summary of the findings of the climate change impact assessment;

(3) A description of the approach used to evaluate the vulnerability of a drinking water system to climate impacts identified in the climate change impact assessment; and

(4) An explanation of the results of the evaluation under subrule (3), including whether the evaluation concluded that the drinking water system is resilient to the climate impacts identified in the climate change impact assessment.

Note that climate change impacts on water quantity have been recognised in the Rules as part of the water quantity water budget assessment. Rule 19(13) requires the inclusion of climate data in the conceptual water budget where climate change projections and modelling are completed (*https://www.ontario.ca/page/2021-technical-rules-under-clean-water-act*).

3- Climate Change Impact Assessment in Assessment Reports

If the local authority decides to include the findings of the climate change impact assessment in the assessment report, the report is to document the assessment results as outlined in sections 3-1 to 3-4 below. In accordance with Rule 9(2), a written description of the work undertaken, which may include but is not limited to climate data analysis, methods, modelling, gaps, and uncertainty analysis, are to be documented in the assessment report.

Note: The Ministry cannot advise on the methodology/assessment approach to use for a climate change impact assessment, but it is important that the local authority ensures the methodology used is robust enough to yield findings from the drinking water source protection perspective. It is important that the authority document the rationale for choosing the methodology and any assumptions and limitations.

3-1 Assessment Approach

A full description of the approach used to evaluate climate change impacts on water quality can include the following:

a. Scale:

   The selection of the study area is an important step in conducting the impact assessment as it explains why the local authority wishes to conduct the assessment and how the scale of the study area services the purpose and scope of the assessment. Depending on the information available, the study area can be at the watershed, sub-watershed(s), source protection area, or regional scale.

   Although there is no specific criterion for selecting the scale of the study area, consider the following while selecting the scale:

   - Type of the drinking water source, i.e. surface water or groundwater, and the drinking water systems (e.g. a lake vs. a river or a deep confined vs. a shallow unconfined aquifer).

- Geology/hydrogeology settings of the area, e.g. Niagara Escarpment or ground watershed.
- Availability of climate data/stations and/or scales of hydrological/hydrogeological modelling relevant to the study area.

The scale of the study area also informs the selection of the approach type as described below.

b. Type: quantitative, qualitative or a combination of both.

Assessment of climate change impacts on water quality can be done quantitatively, qualitatively, or a combination of both *(EPA and CDWR, 2011)*. The quantitative approach uses numerical modelling and analytical tools to understand the relationships between climate indicators (e.g. temperature, precipitation) and hydrological characteristics of the drinking water sources (e.g. surface water levels, aquifer water tables). Whether physical-based / deterministic or statistical, these models may be complex and require substantial local resources and technical capacity to project future impacts on water quality using historical and current data.

The qualitative approach is sometimes preferable where resources, modelling capacity, and reliable data are limited. This approach depends on local expert/traditional knowledge and experience, historical information on specific climate events that may have impacted the quality of water, and a literature review of studies conducted for a specific drinking water system. All these can help estimate the future impact on water quality in qualitative terms such as “good’, “bad”, “low”, “high”, etc.

Given the local characteristics of the study area, a combination of both approaches may be used depending upon the data available, climate and hydrological modelling and findings, etc. When both approaches are used, the final evaluation of climate change impacts will likely be in a qualitative term that can inform discussions around climate change adaptation actions.

c. Concept: top-down or bottom-up.

There are two common concepts to understand climate change impacts on drinking water quality: top-down and bottom-up.

The top-down approach concept relies on global climate models, regional downscaling approaches, and hydrologic models to predict climate change impacts and vulnerabilities at a local water system.

The bottom-up approach concept relies on a local understanding of past and existing conditions of a topic or theme (e.g. water quality analysis) that helps to estimate the future resiliency and adaptation to climate change (*CCME, 2013*).

The selection of the approach concept depends significantly on the available local data, information, and knowledge and the available technical capacity and resources. Figure 1 demonstrates how both concepts achieve an understanding of climate vulnerability, which may be linked to the assessment of climate change impacts (*Dessai and Hulme, 2004*).

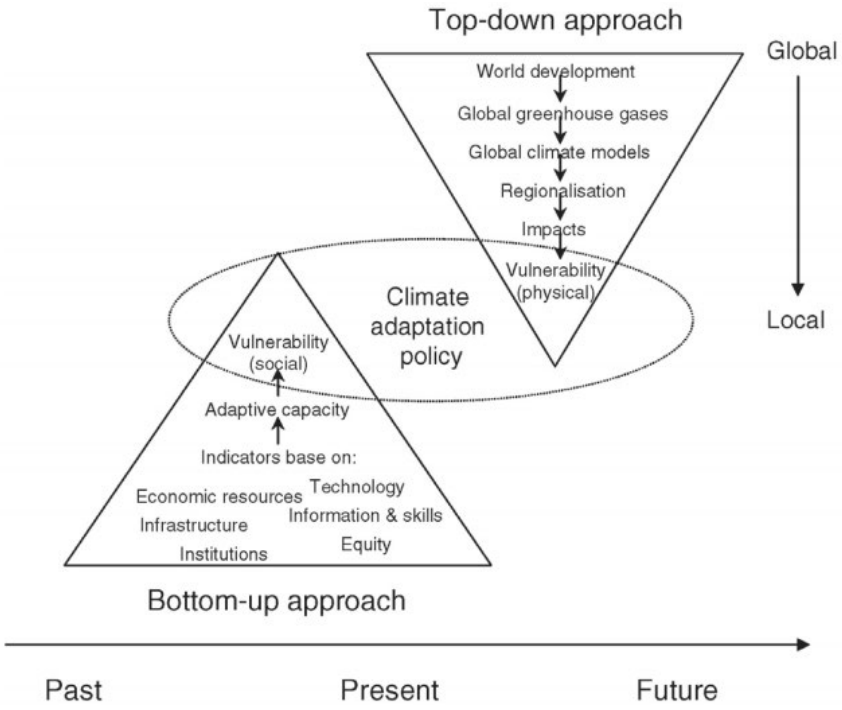

Fig.1: "Top-down" and "Bottom-up" approaches, *Dessai and Hulme, 2004*.

3-2 Data Used for the Assessment

The climate change impact assessment uses climate data, hydrological/hydrogeological data, and source protection information. Data/information sources and the analysis need to be provided in the assessment report. The Ministry of Environment, Conservation, and Parks (ministry) recommends using the best available climate data and information, especially when predicting future climate trends. Using the best available science may narrow the range of uncertainty for each emission scenario used.

Climate data and/or projections would include climatic parameters/indicators such as temperature, precipitation, number of hot days, number of days of freeze-thaw cycles, number of dry days, etc. While climate data and information may be available at many sources, consider using the Ontario-specific high-resolution regional climate data, such as the Ontario Climate Data Portal as described in Appendix C of the guide "Considering Climate Change in the Environmental Assessment Process":
https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process#section-8.

In addition to the climate data, other data/information can support the climate change impact assessment. This includes (and is not limited to):

- Hydrological/hydrogeological data (e.g. runoff, permeability, infiltration rates, land slope, type of soil, size of water contributing area, the interaction of surface water and groundwater (if known).
- Land use data (e.g. rural, urban, and build-up areas).

- Source protection data (e.g. vulnerable areas (WHPAs, IPZs, HVAs, and SGRAs)), type of surface water source (river vs. lake), type of groundwater source (deep aquifer vs. shallow aquifer/confined aquifer vs. unconfined aquifer).

3-3 Assessment Results

Discussion and analysis of the climate change vulnerability assessment results can include the impact on water quality and the resiliency of the drinking water system to climate impacts.

Depending on the approach used to conduct the climate change impact assessment, the discussion and analysis of the findings need to consider the impact on water quality at the:

- Large-scale (e.g. watershed or sub-watershed scale).
- Medium-scale (e.g. drinking water systems vulnerable area), or
- Smaller-scale (e.g. property where drinking water threats could occur).

Given the flexibility in selecting the study area scale, the assessment approach type and concept, and the availability of data to conduct the assessment, it may not be possible to assign clear criteria to determine whether the findings of the assessment show the resiliency of the drinking water system to climate impacts. However, the input data, outputs, and approach selected may help the local authority develop local criteria to determine resiliency. The local criteria should factor in the vulnerability of the drinking water system to climate change as well as the ability of the system to cope with impacts of climate change (i.e. adaptive capacity). Both vulnerability and adaptive capacity could be part of the analysis of the selected assessment approach to determine whether the drinking water system is resilient to climate change.

3-4 Uncertainty Assessment

The factors outlined in Rule 14 can be used to analyse the uncertainty and assign a level of uncertainty of either “low” or “high”. The factors in determining the level of uncertainty depend on the quality of the climate data/information, climate projection, analysis of historical climate data and assessment approaches associated with the work, etc. This analysis, along with the professional judgements or opinions associated with the analysis, can be used to support decisions on whether or not the findings should be included in the local assessment report and/or source protection plans. The outcome of the uncertainty analysis could result in one of the following decisions:

- Do not include findings or results in the local assessment report due to low confidence (high uncertainty) in the findings.
- Include the findings or results in the assessment report and indicate low confidence in the findings.
- Include the findings or results in the local assessment report and indicate high confidence (low uncertainty) in findings.

Depending on the uncertainty level/confidence level, the local authority may choose to revisit the climate change risk assessment, without taking any action at this time, when new data or information becomes available to increase the confidence level in work done and support any future actions to address climate change impacts.

4- Inclusion of Climate Change Impact Assessment in Source Protection Plans

Regulation 287/07, section 29 states that a source protection committee may include anything in the source protection plan that, in the opinion of the committee, will assist in understanding the plan. This can include the findings of climate change risk assessment taking into consideration the outcome of the uncertainty analysis (see section 3-4).

If the local authority wishes to include the findings in the source protection plan, consider if:

- Existing management measures in place at the selected scale (section 3-3) already address the impacts of climate change;
- Additional management measures would address the impacts of climate change on the water quality of the drinking water system; and
- Options are available using non-regulatory approaches or existing municipal authorities if additional measures are warranted.

It is important to understand that the climate change impact assessment findings can not change the extent of vulnerable areas, their scores, or the prescribed threats risk ranking; thus, they can not change the legal effect of a source protection plan policy. Nor should the assessment results automatically necessitate a change in a policy approach.

As per section 26 of O. Reg. 287/07, the local authority may wish to specify actions to collect data on climate change supporting climate change adaptation and resilience actions (e.g. existing frameworks, policies, programs, strategies, action plans, water monitoring, and modelling work) that other jurisdictions have done that may help inform future decision-making within the local source protection area or region.

The following sections provide some examples of various approaches the local authority can use to incorporate the climate change impact assessment outcome in their source protection plans and/or other local programs or policies to support resiliency.

4-1 Education and Outreach and Other Approaches to Encourage Actions

General education and outreach or incentive programs can be applied to a specific area or more broadly applied across a watershed, as per section 22(7) of the Act. Information gathered from the climate change impact assessment can be incorporated into these programs so that communities better understand climate impacts on their drinking water sources. This will help identify opportunities to address these impacts and educate the public on actions that may improve resilience. For example, education and outreach programs could encourage the planting of trees, nature-based solutions, and other green technologies to help improve infiltration and manage stormwater, and green infrastructure solutions (e.g., low impact development, green roofs) to mitigate runoff and potentially reduce flooding.

The information gained from the climate change impact assessment can also be shared with appropriate agencies, including federal, provincial, and municipal governments, for consideration in making informed decisions.

Alternative approaches that don't rely on regulatory obligations, also known as 'soft' tools, such as incentives, best management practices, and stewardship, can encourage landowners or business operators to implement small changes to their operations.

Examples could include recommendations to consider weather conditions before applying pesticides and fertilizers or raising awareness of less toxic alternative products or methods.

Alternatively, the local authority can consider the inclusion of 'specified actions' policies into their source protection plan enabled under s.26 of O. Reg. 287/07. Specified actions policies can only be applied in vulnerable areas and not throughout an entire municipality or watershed.

4-2 Other Actions

Where the local authority is of the opinion that the soft tools noted above are not sufficient to address climate change impacts, they can share the climate change impact assessment findings and results with municipalities and other stakeholders and discuss how this information can be used to support existing local initiatives. This could include:

- encouraging the development or update of a municipal Climate Change Action Plan (akin to a Spills Action Plan) to consider local watershed management plans (e.g. shoreline management plan where various types of adaptation actions are identified), which may help improve the resiliency of the watershed;
- considering how to use local existing natural resource-based plans or initiatives to protect our forests, soils, and wetlands. These initiatives may reduce carbon concentration from the atmosphere (i.e. mitigation) and reduce the potential for extreme rates of runoff (i.e. adaptation). See Appendix B of the guide "Considering Climate Change in the Environmental Assessment Process" for more information.
- the review of local infrastructure plans and emergency response protocols and procedures to incorporate considerations into planning and prioritizing infrastructure improvements. For instance, considering the need for emergency or backup drinking water supplies.

4-3 Regulatory Tools Outside of the *Clean Water Act, 2006*

If the local authority wishes to pursue further actions to address climate change impacts, some regulatory approaches could be used outside the Act's framework. For example, the climate change risk assessment information can support land use planning decisions under the *Planning Act, 1990* and policies in the Official Plan for development projects. This could include recommending that a municipality ensure up-to-date floodplain mapping is used in municipal planning decisions around drinking water systems that are particularly vulnerable to climate change impacts. The process to consider climate change in land use planning is similar to how impacts are considered in environmental assessment projects.
(*https://www.ontario.ca/page/considering-climate-change-environmental-assesssment-process).*

The local authority could also consider sharing climate change impact assessment results with Risk Management Officials (RMOs) for their consideration when implementing source protection plan policies that rely on Part IV of the Act. For instance, an RMO negotiating a new risk management plan may consider including resiliency measures and/or best practices as part of the plan to adapt to climate risks. The Risk Management Measures Catalogue could be a source of information when selecting these measures.
(*https://data.ontario.ca/dataset/risk-management-measures-catalogue*).

Ultimately, considering climate change impact information in the assessment report and source protection plan can help the local authority better understand the impacts of climate change on the quality of drinking water sources in their source protection area, watersheds, or specific drinking water systems. Information sharing would help decision-making authorities and landowners alike consider climate change impacts in their planning and management decisions to protect sources of drinking water.

5- References

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https://www.ontario.ca/page/2021-technical-rules-under-clean-water-act

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Salt contamination of Lake Simcoe a frightening warning about highway expansion

Lake Simcoe is on a trajectory to reach toxic levels of salt in 37 years if current patterns continue.

By **Claire Malcolmson**Contributor
Mon., Feb. 14, 2022timer2 min. read
updateArticle was updated 1 day ago

Road salt contamination of freshwater waters asks the question, can we make do with the roads we have?

A deep dive into the salt pollution of fresh waters has led me to some radical thinking. Lake Simcoe, a large freshwater lake an hour north of Toronto, is on a trajectory to reach toxic levels of salt in 37 years if current patterns continue.

Models indicate that 64 per cent of plants and animals in Lake Simcoe may already be affected by salt contamination. Having saltier water allows for easier invasions from salt water species into our freshwater lakes, and having more salt in low-oxygen water helps create conditions for harmful algae blooms, which make the water dangerous to swim in and drink.

We ignore the impacts of salt at great risk to ourselves, not to mention to all the other living things in freshwater. Science is telling us that the lake will be toxic in one generation unless we change course. In 37 years, my little boys might have their own kids. The thought that they could not safely swim in the lake is devastating. It’s an example of the intergenerational unfairness that centuries of unbridled growth and externalizing environmental impacts have yielded.

The controversial Bradford Bypass highway is proposed to cross many rivers that flow through the Holland Marsh farming and wetland areas, on their way to Lake Simcoe. One of these is the East Holland River, whose annual chloride (salt) concentration is 224 mg/L, roughly double the Canadian Water Quality Guideline for long-term exposure for the protection of aquatic life

from chloride, of 120 mg/L. Studies confirm that major highways contribute to chloride hot spots in rivers.

Seems not a good time or place to put another salt-spewing highway.

And yet, the province of Ontario is ramming the Bradford Bypass through without completing the Environmental Assessment (EA), having exempted themselves in October 2021. They are evicting people from their homes now, and want to start construction in March 2022, in their haste, before a budget, detailed engineering drawings, or environmental studies are complete. Adding insult to injury, last Wednesday the Federal Environment Minister declined, for a second time, to intervene with an Impact Assessment of the highway project, disappointing local requesters.

I think these governments have it wrong. People do not only love their cars. I believe people want a better commute AND they want to know that governments are taking care of our water and environment so that we don't need to worry about anyone taking a swim one generation from now.

One of the radical solutions that we need to consider is this: what if we stop building new roads, and just make better use of what we have? That is already happening in more enlightened parts of the world. We can work toward this by building up where possible and increasing the density of people in existing neighbourhoods.

It's time we get real and accept that the perpetual growth party is over. Let's make sustainability the priority it needs to be so that people and fish can continue to enjoy one of life's glorious pleasures — swimming in freshwater lakes.

Claire Malcolmson is the executive director of the Rescue Lake Simcoe Coalition.

‘Lethal levels of salt’ seen in some southern Ontario waterways, warns WWF Canada

World Wildlife Fund Canada said its new maps tracking chloride from road salt show levels in many rural and urban southern Ontario waterways are increasing dangerously.

By **Paola Loriggio**The Canadian Press
Wed., June 19, 2019timer2 min. read
updateArticle was updated Jun. 20, 2019
READ THE CONVERSATION

Road salt levels in southern Ontario waterways have hit record highs, making some as salty as the ocean, environmental advocates said Wednesday as they called for measures to mitigate the impact on species and ecosystems.

World Wildlife Fund Canada said its new maps tracking chloride from road salt show levels in many rural and urban southern Ontario waterways are increasing dangerously.

Salt’s chloride component is toxic to freshwater species and ecosystems, compromising habitats for fish, frogs, mussels and other creatures, and endangering their survival during the spring and summer spawning season, the organization said.

“Basically it’s lethal levels of salt we’re seeing,” said Elizabeth Hendriks, WWF Canada’s vice-president of freshwater.

She said healthy levels for aquatic life should be less than 120 milligrams per litre, but the maps show some areas in southern Ontario currently have levels greater than 1000 milligrams per litre.

Hendriks said a few years ago, people found a blue crab in Cooksville Creek in Mississauga, Ont., and couldn’t explain how it got there.

How road salt is contaminating North America’s lakes

‘Astonishing amount’ of pollution in Ontario’s lakes, rivers: environmental commissioner

“Blue crab is an ocean crab but it was thriving a freshwater stream. So how do we begin to reverse that trend?” she said.

The maps released Wednesday are based on provincial data collected during the summer months and allow researchers to compare chloride levels going back roughly a decade, according to WWF Canada. The most recent numbers date back to 2016.

More than seven million tonnes of road salt are used in Canada each winter by public road agencies, while use by small towns and private sector companies is not currently tracked in Ontario, the organization said.

The federal government has released standards on the use of road salt but those are not the same as regulations, Hendriks said. The Ontario government, meanwhile, has listed salt contamination as a major issue in its environmental plan, she said.

It’s important to work with the private and commercial organizations as well to get them to reduce their salt use, she said.

Residents, too, are overestimating how much salt is needed, Hendriks said, adding it only takes the equivalent of a small pill bottle to melt ice from a city sidewalk slab.

“People just don’t often connect that what we do on the land, especially in winter when we’re not thinking about our lakes and streams as much ... (with how it) impacts our lakes and streams,” she said.

“That salt doesn’t disappear come spring, it just flows into our lakes and rivers.”

Correction - June 20, 2019: *This article was edited from a previous version that misstated the measure of salt levels in micrograms per litre.*

COVID-19 wastewater data suggests London, Ont. past the peak of Omicron

By **Andrew Graham** **Global News**
Posted January 19, 2022 6:29 pm

View image in full screen
London's Greenway wastewater treatment facility. The plant treats some 60 per cent of London's wastewater. **Google Maps**

While the data certainly stinks, a local wastewater surveillance project is spelling good news for London, Ont., when it comes to containing the spread of COVID-19.

For most of the pandemic, researchers at Western University have been tracking the viral load of SARS-CoV-2 excreted in the feces of infected individuals by sampling from London's five wastewater treatment plants.

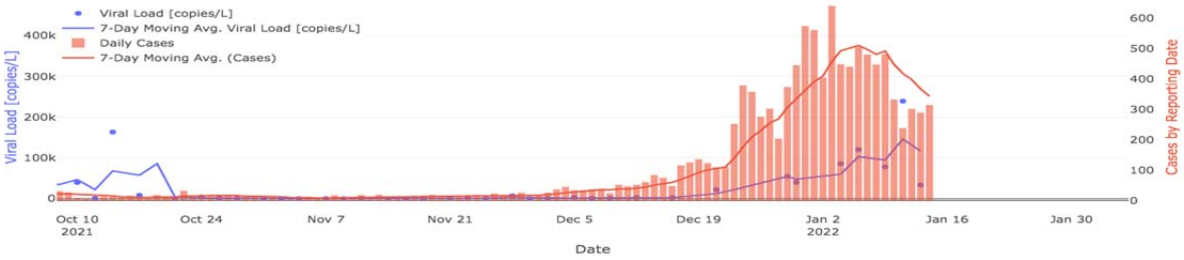
This week, the latest findings showed the first significant drop in viral load so far during the current Omicron wave.

READ MORE: Sewage surveillance: Wastewater could fill COVID-19 testing gaps, experts say

Christopher DeGroot, an assistant professor in Western's department of mechanical and materials engineering, as well as the co-lead researcher of the project, says the drop was first observed when comparing last Thursday's wastewater data with last Tuesday's.

Another drop in viral load was seen in results gathered from a sample taken on Sunday.

"We do believe that based on these findings that we have most likely passed the peak of Omicron infections in London," DeGroot said.



Data gathered from the wastewater surveillance project between Oct. 10, 2021 and Jan. 14, 2022. **via 519covid.ca**

DeGroot says the findings are consistent with what's been reported from the Middlesex-London Health Unit in regard to a potential peak in cases.

During a media briefing on Tuesday, acting medical officer of health Dr. Alex Summers said that while COVID-19 rates are high, "some early indications are consistently suggesting that we are seeing a plateau in the burden of illness in our community."

Ontario Health Minister Christine Elliott also noted on Wednesday morning that the province is starting to see "glimmers of hope" in fight against COVID-19's Omicron variant, with cases expected to peak this month followed by a peak in hospitalizations and ICU admissions.

2:02

COVID-19: Ontario sees 'glimmers of hope' in Omicron fight, health minister says – Jan 19, 2022

Tracking of COVID-19 spread has changed in recent weeks and daily case counts are no longer considered a fully reliable reflection of the virus' activity, thanks to changes in eligibility for PCR testing.

DeGroot says this has made wastewater surveillance more valuable than ever.

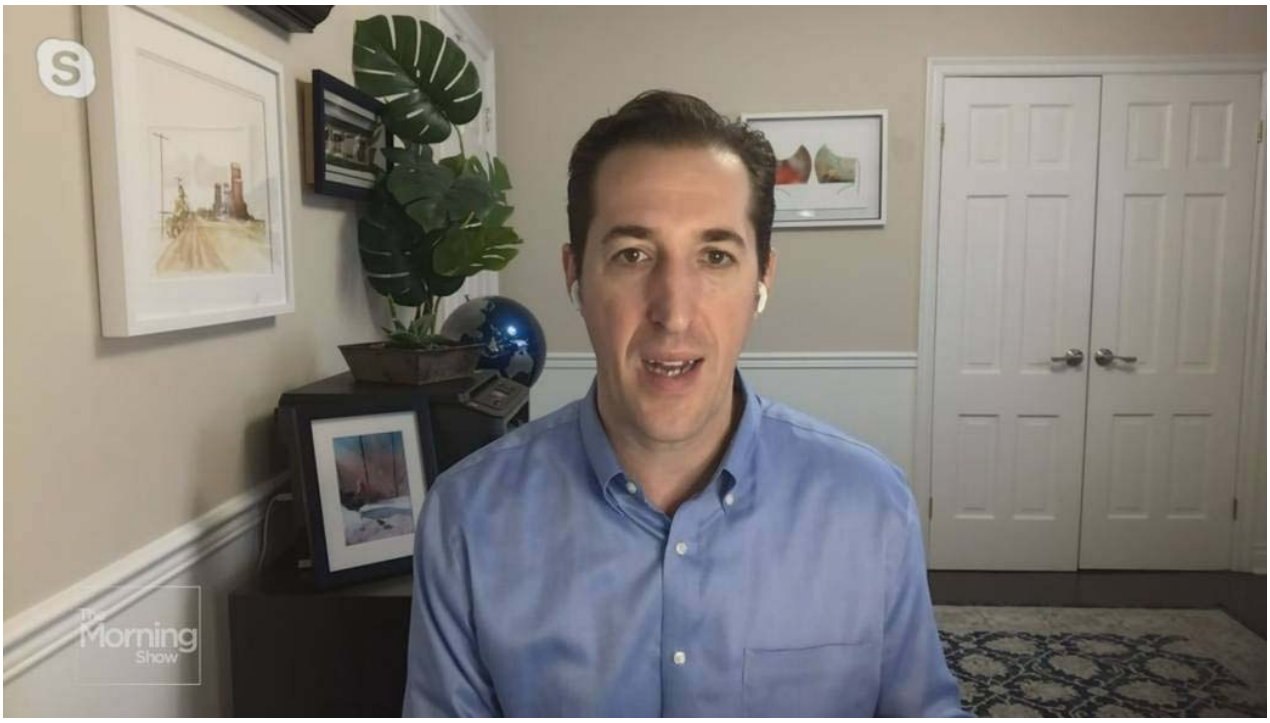
“We don’t really know the true case numbers whereas if someone is infected, we know that they’re shedding virus into the sewer system which we’re picking up at the wastewater treatment plant,” DeGroot said, adding that the ongoing monitoring of wastewater will be vital to seeing whether the downward trend continues.

“There’s going to be changes in behaviour, things like school openings and potential reductions in health restrictions, and so all of those can change the number of contacts people have and the number of infections that occur.”

First announced as a pilot in July 2020, the project, which is jointly led by fellow Western professor Eric Arts, has evolved in its ability to track COVID-19 data in wastewater.

“Late last year, we started doing genomic sequencing on the wastewater and that was just prior to the Omicron wave,” DeGroot said.

“We were able to notice that the presence of Omicron in the wastewater went from nearly zero when we started doing the sequencing to the case now where it’s clearly dominant.”



7:29

Peak of the fifth wave could be this week experts warn – Jan 17, 2022
The City of London also has a hand in the project by providing the samples analyzed by researchers.

Gary Burrows, a supervisor of wastewater operations for the city, says surveillance projects such as the one in London have spurred countless conversations in wastewater circles.

Burrows says this includes sharing knowledge through networks such as the Water Environment Association of Ontario.

“I’m a board member on that, I represent professional wastewater operators for Ontario, and we send reports in and look for information from other municipalities that are occurring during this COVID time to see if we can help out people within our wastewater networking system,” Burrows said.

The work has also made Burrows excited for the future of wastewater surveillance, which he believes may be used to track other items of interest, such as new viruses or items that are harmful to the environment.

“I think the research has really opened up what wastewater-based epidemiology can do.”

1:49**Toronto to collect COVID-19 data through wastewater**
Toronto to collect COVID-19 data through wastewater – Jan 19, 2022

Oneida Nation on verge of joining Lake Huron water supply system

The Oneida Nation of the Thames could soon be the first London-area First Nation to join one of the region's two largest water supply systems.

Author of the article:
Calvi Leon • Local Journalism Initiative Reporter
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Oneida Nations of the Thames Elected Chief Adrian Chrisjohn is shown in this photo taken Monday Nov. 22, 2021. Derek Ruttan/The London Free Press/Postmedia Network

Article content

The Oneida Nation of the Thames could soon be the first London-area First Nation to join one of the region's two largest water supply systems.

The First Nation community, about 30 kilometres southwest of London, is asking the Lake Huron water board to connect to its water system, a move that could help bring its two-year boil-water advisory to an end.

"(The project) would be about growth, about providing a safe, sustainable drinking water source for our community members," said Oneida Nation of the Thames Chief Adrian Chrisjohn.

“We currently don’t have that … so we’re continuing to push forward for Oneida Nation members.”

A recommendation to endorse the proposed $20.6-million project comes before the Lake Huron water board on Thursday.

“I’m very hopeful the board will see that this is a really good opportunity to solve … ongoing issues that Oneida Nation has had with their water system, in a way that’s sustainable (and) aligned with the services we provide,” said Kelly Scherr, chief administrator for the Lake Huron and Elgin area water supply systems.

Oneida’s request to join the water system comes after the First Nation conducted a water feasibility report that looked at options to improve its water supply and address the community’s 20-year needs. With help from First Nations Engineering Services Ltd., it was initiated in response to the First Nation’s boil-water advisory that has been in effect since 2019 and periodically before then.

The board’s endorsement would allow the First Nation to proceed with further discussions and its funding application to Indigenous Services Canada to help cover project costs. It would also mean moving forward with negotiations for a water supply agreement, including the design, construction and operation of the connecting water transmission pipeline.

As of now, the pipeline route ends at Mt. Brydges. But the proposed plan would see it extended west along Glendon Drive and south to a connection point near Muncey Road and Jubilee Drive. Construction would be expected to start in 2023.

Oneida Nation of the Thames’ existing water supply system uses an infiltration gallery beneath the east bank of the Thames River. It includes a pumping station and control building, a treatment plant and a storage reservoir.

“That water treatment plant has been identified as not sustainable,” Chrisjohn said. “Right now, if we have a different source of water, that’s going to put us way ahead of the game as far as being able to build that capacity to treat and deliver water to community members.”

The collaborative project wouldn’t just be about receiving clean drinking water, Chrisjohn said. “It will also feed our fire volumes.

“We have fire hydrants through the community, and unfortunately, we have had fatalities due to structure fires. This will really help us develop and grow our own infrastructure within our territory, to hopefully prevent tragedies like that in the future.”

The Lake Huron Primary Water Supply System serves an estimated 400,000 people in Bluewater, South Huron, Lambton Shores, North Middlesex, Lucan Biddulph, Middlesex Centre, Strathroy Caradoc and London. Located near Grand Bend on Lake Huron, the water treatment plant has a capacity of 340 million litres each day.

Oneida Nation of the Thames, which is home to about 2,225 and has a projected population of nearly 3,240 by 2041, would be the first First Nation to receive water from the Lake Huron water system.

“This is the first time we’ve had a First Nation asked to join” either of the water systems, said Scherr.

“We’re hoping (the board) give (the request) due consideration … and that the doorway remains open for other municipalities or First Nations in the region who might want to have a similar conversation.”

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