

**Discussion Paper: Consideration of additional policies to
address Drinking Water Issues identified in the
inaugural CTC Source Protection Plan**

Section 36. CTC Workplan 2018 Item 9

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Executive Summary

The Credit Valley, Toronto and Region, Central Lake Ontario (CTC) Source Protection Plan, along with the supporting Assessment Reports, was approved by the Province of Ontario (MECP) and came into effect on December 31, 2015. Section 36 under the *Clean Water Act, 2006* contains the provision to comprehensively review and update source protection plans, including assessment reports at established intervals (approximately every 5 years as directed by the Province). An order was issued under Section 36 of the Clean Water Act, 2006 by the Minister of the Environment and Climate Change (now MECP) in July 2015 to prepare and submit a workplan for a S. 36 Source Protection Plan (SPP) update, to the Ministry by December 21, 2018 (submitted).

A S. 36 update is a broad scale review, and the activity is focused on keeping the Assessment Report and Source Protection Plan up to date with general amendments, and policy efficacy changes. The CTC workplan, developed in response to the order, was finalized on December 21, 2018, after consultation with all stakeholders. The Minister amended their previous order through a new order issued on July 22, 2019, identifying the “mandatory updates” to the CTC Source Protection Plan and the three Assessment Reports.

Table 1 in the workplan lists numerous tasks. Task 9 is the consideration of additional policies to address *drinking water “issues” identified in the inaugural Source Protection Plan, 2015*. These issues are associated with delineated Issue Contributing Areas (ICAs) created following the Technical Rules. There are 5 ICAs in the CTC Source Protection Region. Three for Sodium and Chloride in Orangeville, one for Chloride in Georgetown and one for nitrate in Acton. Policies in the CTC Source Protection Plan to address these issues were approved in 2015 by the Province.

If it is determined by the Source Protection Implementation Working Group that there is a need for new and or updated “issue contributing area” policies, the team will proceed with the preparation of draft policies, consultation with stakeholders and the Province, as required prior to implementation.

This paper discusses MECP’s Technical Rules (2021) under the *Clean Water Act, 2006* associated with the identification of an *issue*, the delineation of issue contributing areas (ICAs), monitoring and reporting requirements and the policies designed to eliminate the issue. It describes the ICAs in the CTC and the reasons for the identification of this policy review in the CTC’s S. 36 workplan, and it seeks to provide decision-making support information to determine if the current ICA policies are adequate, whether the current policies need to be revised and or if additional policies are needed to eliminate the issue. Changes to the Technical Rules are also assessed to determine the impact on existing policies. Recommendations are provided.

The paper concludes that whereas the issue associated with nitrate appears to have stabilized and does not exceed the Ontario Drinking Water Standards in all projections to 2051, it may be appropriate to consider delisting the Acton ICA. It is highly recommended that a methodology

and process be developed by the CTC SPR for the delisting (and listing) of ICAs inclusive of threshold triggers and timelines in order to allow for more efficient management of municipal water quality. The existing *Clean Water Act, 2006* 'prohibition' policies for nitrate activities, along with provisions in the *Nutrient Management Act*, appear to adequately manage the activities that could impact nitrate levels in Acton. Additionally, the model for the Acton area is being revised which is likely to reduce the number of properties impacted by the ICA.

Sodium and chloride trends conversely continue to rise at most wells identified with an issue across the CTC. To compound this observation, there is no mechanism to trigger trend analysis at non-ICA wells for identification of issues elsewhere.

Several recommendations are made for updated and new policies to assist with the mitigation and eventual elimination of the Sodium and Chloride issues identified in the CTC Assessment Reports, and with the ongoing assessment of all municipal drinking water system wells in the CTC SPR. Recommendations range from expanded education and outreach programs regarding salt application, future prohibitions, enhanced reporting and development approval conditions for Issue Contributing Areas and large sub-divisions, insurance liability reviews (waivers/credits for alternative environmental efforts), to alternative methodology pilots in some ICAs and automated water quality trend analyses for all drinking water systems in the CTC Source Protection Region.

Preamble

The CTC SPP, along with the supporting Assessment Reports, was approved by the Province of Ontario (MECP) and came into effect on December 31, 2015. Section 36 under the *Clean Water Act, 2006* contains the provision to comprehensively review and update source protection plans, including assessment reports at established intervals (approximately every 5 years as directed by the Province). The Province subsequently eliminated this S.36 requirement with the understanding that updates to the Assessment Reports are ongoing under S.34 amendments. No future S.36 comprehensive update orders are anticipated. Periodically updating these documents, nonetheless, ensures that all municipal drinking water systems are protected, and that changing biophysical and social conditions are captured in future planning for source water protection. Comprehensive updates may be coupled with the amendments that will occur (such as Drinking Water System updates) under Section 34 of the Act.

The CTC Source Protection Region was issued an order under section 36 of the *Clean Water Act, 2006* by the Minister of the Environment and Climate Change in July 2015. The CTC workplan, developed in response to the order, was finalized on December 21, 2018, after consultation with all stakeholders. The Minister amended their previous order through a new order issued on July 22, 2019, identifying the “mandatory updates” to the CTC Source Protection Plan and the three Assessment Reports. Current timelines require all mandatory tasks to be completed by the end of 2024.

CTC S.36 Consideration/Review Items

The 2018 CTC Section 36 workplan (P. ii - Table 1, Section 36 Workplan, CTC Source Protection Region, December 21, 2018) includes numerous tasks. Three of those tasks, listed two “consideration of new policy tasks” and a policy review task:

- **Item 6:** the consideration of a new local threat with policies to address transportation of dangerous substances,
- **Item 9:** the consideration of additional policies to address drinking water “issues” identified in 2015.
- **Item 11:** It also documented a task to review the existing local liquid hydrocarbon pipeline policies to determine if they are adequate, given that this local threat was added as a Provincial threat under the Technical Rules July 2018 amendments. The circumstances related to pipelines may differ from those considered in 2015 in the CTC.

It is expected that *new* policies, where developed, will go through research and consultative processes as did original Plan policies. Such work may also include technical studies, numerical modelling exercises and industry consultation, to determine the level of risk prior to the drafting of any new policies. All work will be brought to the Committee’s Implementation Working group and the Source Protection Committee for approval/endorsement.

CTC staff will examine workplan items to:

- Review where available, updated statistics/ background information regarding incidents and water quality trends.
- Prepare technical analysis including statistical analyses and or numerical modelling as needed.
- Determine new/ updated risks to the CTC with metrics where appropriate.
- Review action/ legislation/ legal instruments in other jurisdictions.
- Prepare a rationale document for consideration by the SPC.
- Update documentation with SPC input.
- Prepare new/updated draft policies as necessary.

If it is determined by the Source Protection Implementation Working Group that there is a need for the addition of new or revised policies, the team will proceed with the preparation of draft policies, consultation with stakeholders and the Province, as required prior to implementation.

This report pertains to Item 9: the consideration of additional policies to address drinking water “issues” identified in 2015.

1 Background

In 2015, the CTC Source Protection Region submitted its first Source Protection Plan (SPP) under the *Clean Water Act* (2006). The SPP is supported by an Assessment Report which describes the jurisdiction where the SPP applies including delineated Source Protection areas; namely Well Head Protection Areas (WHPAs), Intake Protection Zones (IPZs), Highly Vulnerable Areas (HVAs) and Significant Groundwater Recharge Areas (SGRAs). Within WHPAs, IPZs and HVAs, vulnerability analyses and scoring determine which anthropogenic activities constitute significant, moderate, or low water quality threats to the drinking water source in question.

In 2006, the Province listed 21 prescribed activities that could pose a threat to drinking water complemented by a table listing the circumstances under which these activities could be a threat. Circumstances supporting the determination of threat level are outlined in the Provincial Table of threats. Both the list of activities and the circumstances are subject to revision under the principle of continuous improvement. These revisions are supported by new information, data and scientific advancement. In 2017 and again in 2021, the Province revised the Technical Rules and the circumstances for Drinking Water Threats. In the last iteration, the Province added 1 prescribed activity (liquid hydrocarbon pipeline) for a current total of 22.

Additional to WHPAs, IPZs, HVAs and SGRAs, the Technical Rules under the *Clean Water Act, 2006* (CWA) direct the delineation of zones known as Issue Contributing Areas (ICAs) when monitoring data demonstrates an increasing contaminant trend.

1.1 Consideration of additional policies to address Drinking Water Issues identified in the inaugural CTC Source Protection Plan (2015)

1.1.1 Issues Approach in the identification of Significant Threats to Drinking Water

A drinking water Issue is a documented, existing problem with the quality of the source water. An Issue exists if a contaminant is present at a concentration that may result in the deterioration of the quality of water used as a source of drinking water, or if there is a trend of increasing concentrations of the contaminant. Every elevated contaminant in the raw water is not necessarily considered an Issue.

Elevated parameters are not considered an Issue when they are known to be naturally occurring and do not present a problem for the water treatment plant operator. For Issues caused by human activities, the Assessment Report must delineate the area contributing to an Issue or include a plan to delineate the Issue Contributing Area. Once a drinking water Issue is identified, then any activities or conditions that may be causing that Issue needs to be identified. This is called the Issue approach to identifying drinking water threats. Issues are generally identified by Municipal Drinking Water Operations staff in collaboration with staff of

the Source Protection Region. The issue is determined through the ongoing analysis of drinking water system and raw water monitoring results.

Once an Issue has been confirmed, the next step is to identify an Issue Contributing Area (ICA) in the vicinity of the location at which the Issue has been observed. The ICA may be different than the associated vulnerable area (WHPA or IPZ). In the second step, specific prescribed drinking water threats (identified in the [table of drinking water threats](#) (swpip.ca)) that could reasonably be expected to contribute to the Issue are listed and examined for potential contribution to the issue. All such threats are automatically classified as significant. Maps (Appendix F) included in the CTC SPP show the location of Issue Contributing Areas where significant drinking water threats may occur.

Within a WHPA or an IPZ, the vulnerability score coupled with the circumstance will determine the level of threat BUT in an ICA, prescribed threats may be identified as significant regardless of the vulnerability score if it is determined to be significantly contributing to the increasing trend. If the activity is taking place in an Issue Contributing Area and is releasing one of the chemicals identified in the Tables of Drinking Water Threats, the activity is a significant drinking water threat, regardless of vulnerability score. (CTC Source Protection Committee, 2022, p.58). The listing of activities that are designated as significant is prepared by the Municipality and or their agents.

1.2 Issues identified in the CTC Source Protection Region

In the CTC SPR, there are 5 ICAs that were delineated in the 2015 Assessment Reports. Three for sodium and chloride in Orangeville, one for Chloride in Georgetown and one for Nitrate in Acton.

Specifically:

- Sodium for Orangeville Wells 6, 9A/9B, 11 and 10 and Sodium for wells 6, 9A and 9B.
- Chloride for Georgetown wells Cedarvale Wells 1A, 4 and 4A.
- Nitrate for Acton wells Davidson Wells 1 and 2.

The CTC SPR Sodium and/or Chloride ICAs affect two other Source Protection Regions (the Lake Erie and Halton-Hamilton Source Protection Regions).

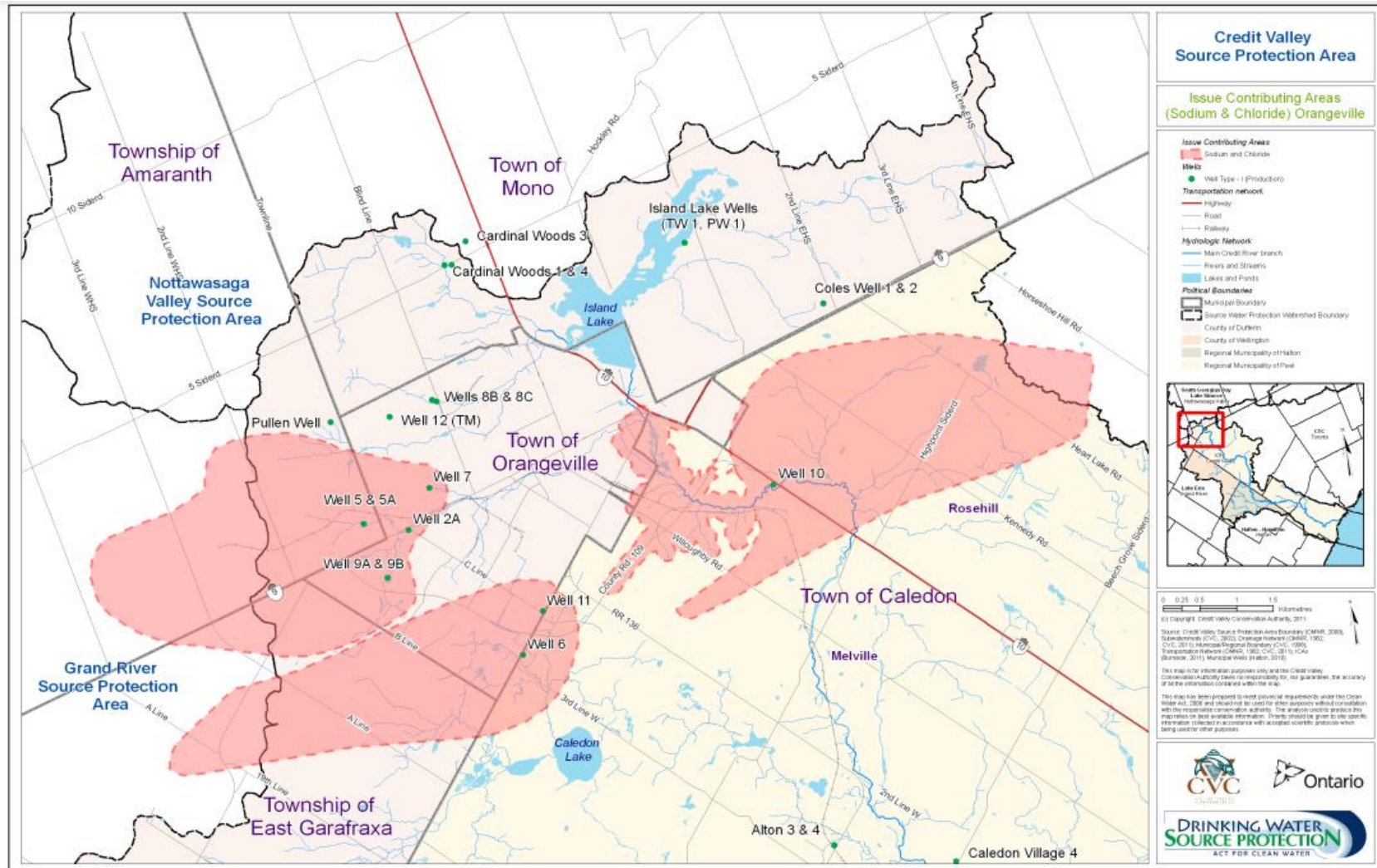


Figure 1. Map of Issue Contributing Areas (Sodium &/or Chloride) in Orangeville from the Credit Valley SPA Assessment Report (2019)

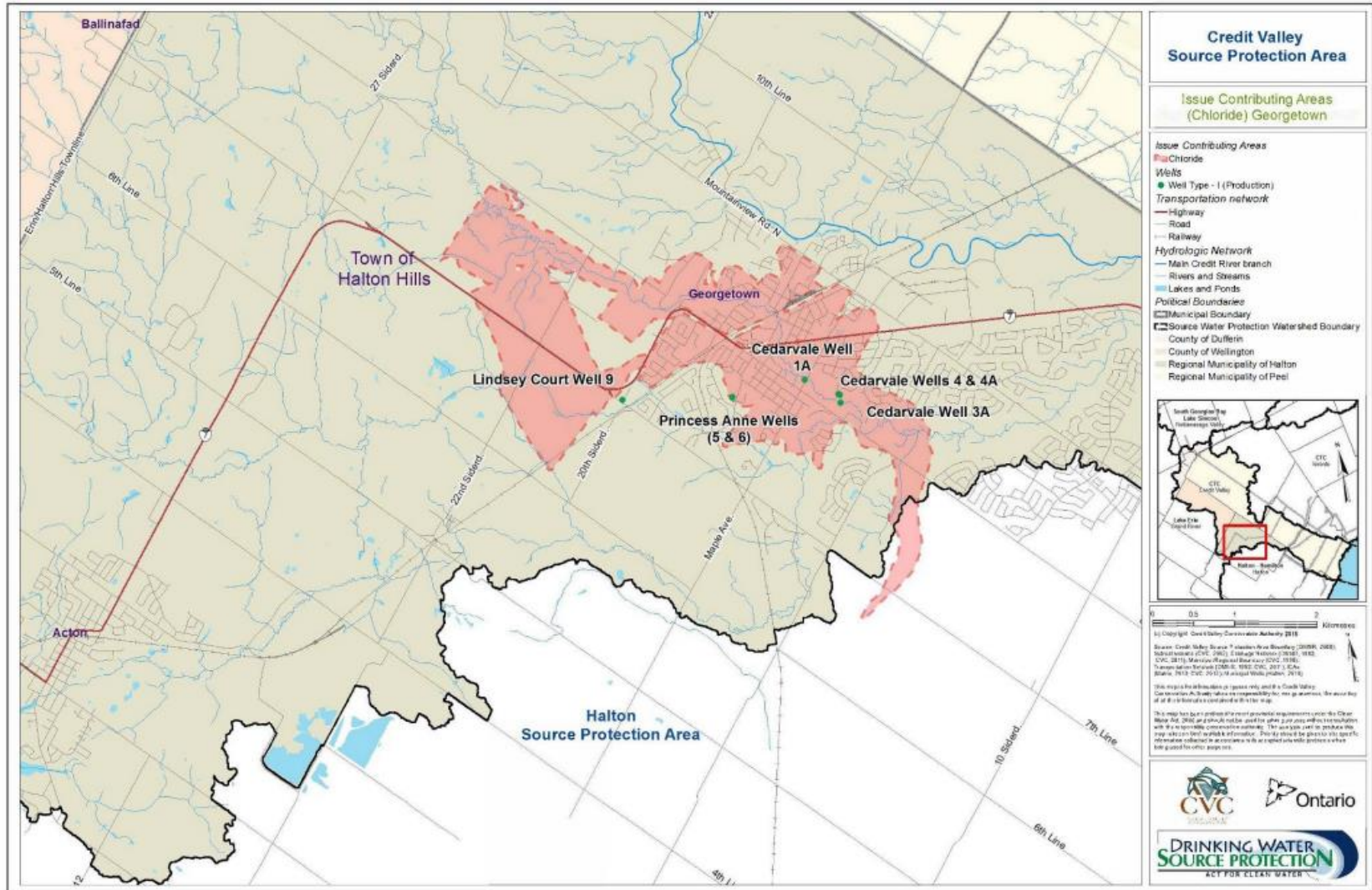


Figure 2. Map of Issue Contributing Areas (Chloride) in Georgetown from the Credit Valley SPA Assessment Report (2019)

1.3 Nitrate, Sodium and Chloride in Drinking Water - Impacts and Sources in the CTC SPR

1.3.1 Nitrates

Nitrates are colorless and odorless and occur naturally in the environment as nitrogen which then combines with oxygen or ozone to form nitrate. Nitrogen is essential to all life but high levels in drinking water can be harmful to humans. Nitrates can enter drinking water when nitrogen sources infiltrate into the groundwater system and/ or flow into surface water that is used as a source of drinking water. Sources of nitrate include fertilizers, leachate from garbage dumps, animal feces, animal feedlots, municipal and industrial wastewater, and septic systems. Harmful effects: An elevated level of nitrate in drinking water is primarily a health concern for bottle-fed infants less than six months of age who have not yet developed the ability to properly digest nitrates. This can lead to a rare but very serious condition called methemoglobinemia or blue-baby syndrome. The inability to digest nitrate leads to the production of nitrite which affects the amount of oxygen carried in the blood, resulting in a bluish skin color. On the Simcoe Muskoka District Health Unit (n.d.) website, it states that: “Nitrates have also been classified as a possible carcinogen by the International Agency for Research on Cancer (IARC) if they undergo changes in the body that result in the formation of N-nitroso compounds. The extent to which this reaction occurs in the body is influenced by long-term consumption of high levels of nitrates in exceedance of the drinking water guidelines and diet”. Nitrate can be eliminated by removing the sources or treated by ion exchange, reverse osmosis, and electro dialysis. The Ontario Drinking Water Quality Standard (ODWQS) for nitrate is 10 mg/L as nitrate-nitrogen. If a water quality issue is identified, such as high concentrations (or an increasing trend) of nitrate, issue contributing areas (ICAs) can be delineated. Locally developed source protection plans include mandatory policies for ICAs to ensure that the source water quality is protected or improved.

1.3.2 Sodium

Sodium is essential for the normal functioning of the human body. It can be found in all body tissues and fluids, and it is not generally considered harmful at normal levels of intake from combined food and drinking water sources. The aesthetic Ontario Drinking Water Quality Standard for sodium is 200 mg/L. Sodium in drinking water can, however, be harmful to infants and people who suffer from high blood pressure, cardiovascular disease, or kidney problems. Public drinking water systems under the *Safe Drinking Water Act, 2002* are required to take samples for sodium on a regular basis and report to the Medical Officer of Health when sodium levels exceed 20 mg/L.

1.3.3 Chloride

Chloride is naturally occurring and primarily found in seawater. Smaller quantities at higher concentrations can be found in brine wells and inland seas such as the Dead Sea in Israel. Chloride is also found in bodily fluids and is an essential electrolyte. The concentration of chloride in the blood is called serum chloride, and this concentration is regulated by

the kidneys. Most chloride salts are soluble in water. Chloride can have deleterious impacts. Chloride can cause the corrosion of metals and steel embedded in concrete often resulting in the deterioration of building and utility infrastructure. High levels of chloride may also have environmental impacts. Increased concentrations of chloride can cause a number of ecological effects in both aquatic and terrestrial environments. It may contribute to the acidification of streams, mobilize radioactive soil metals by ion exchange, affect the mortality and reproduction of aquatic plants and animals, promote the invasion of saltwater organisms into previously freshwater environments, and interfere with the natural mixing of lakes. Chloride in drinking water is not harmful to humans and concerns are related to the common association of high levels of sodium that frequently are found with high levels of chloride. The drinking water standard (aesthetic) for chloride is 250 mg/L. This standard is the level at which the taste of salt is discernable in the drinking water making it generally unpalatable.

To help the public travel safely in the winter season, winter maintenance chemicals, predominantly sodium chloride often referred to simply as road salt, are applied to roadways, parking lots, sidewalks, and driveways. Other activities such as the discharge from water softeners may serve to elevate these chemicals in source waters. Studies were conducted in the CTC to determine the significance of water softeners and they were found to have a minimal influence on the trends relative to road salt application. The application and storage of de-icing salts as well as snow storage have been determined as the main activities responsible for the increasing sodium and chloride trends in the CTC SPR. The focus of policies and implementation efforts has been on these sources. Treatment processes that can remove sodium and chloride from water include reverse osmosis, distillation, and deionization – which are all expensive to undertake, energy intensive and result in further waste to be handled. The only current practical way to minimize the impacts from road salt is to reduce the amount being used, without compromising the safety of the public during winter conditions.

Locally developed source protection plans include mandatory policies for ICAs to ensure that the source water quality is protected or improved.

1.4 CTC ICA Policies

The ICAs are subject to 48 different policies outlined in the CTC SPP. These include General, Salt, Snow, Waste, Sewage, NASM, ASM, Livestock and Fertilizer policies:

Policies for ICA N/Pathogens: Gen-6, Waste-3, Sewage, NASM, ASM, and Livestock (33). There are currently no pathogen ICAs in the CTC Source Protection Region, but these policies were designed to address pathogens should that become an issue in the future.

- Policies for ICA N: Fertilizer (4)
- Policies for ICA Na and/ or Cl: Salt, Snow (10)

ICA policies all include a provision for ongoing annual monitoring and reporting of trends. These reports are completed as part of Annual Plan efficacy reporting required by the Province under the CWA (2006).

1.4.1 Current Status of Trends in the CTC ICAs

Two wells in Acton were identified with nitrate issues. To date, the nitrate trend shows no discernable change when a longer period data set is used. A shorter period of data shows stable conditions (using a Regression Analysis method) to a decrease for the Davidson 2 well (using Generalized Additive Mixed Models or GAMMs method) in trends. The Davidson 1 well shows stable to low increase using both Regression Analysis and GAMMS though all current levels and projections to 2051 for both wells, exhibit levels below the Ontario Drinking Water Quality Standards (ODWQS) of 10 mg/L. (CTC Source Protection Region, 2023a). The CTC 2022 Annual report indicates that concentrations of Nitrate in the Acton wells appear to be stabilized (CTC Source Protection Region, 2023b; see page 8).

No thresholds nor trend timelines for exceedance of the ODWQS for delisting (or listing) exist in the Rules. The Source Protection Committee in consultation with the Municipalities, currently determine where it is appropriate to delineate an ICA per the Province's local decision-making approach. The SPR makes the recommendation to the Province and must support the recommendation with data and trend analysis. Originally, ICAs were defined where a trend showed an increase irrespective of timelines to exceed the ODWQS. Longer periods of data now show that at the Davidson wells, the levels of nitrate appear to have stabilized, and the projections to 2051 do not show an exceedance of the Drinking Water Standards.

Though it may be still too early to tell, it could be assumed that provisions under the *Nutrient Management Act, 2002* coupled with the nitrate-source Source Water Protection policies under the *Clean Water Act, 2006* are having the intended effect of at least 'managing the trends' at this stage. Additionally, an upcoming numerical model update for the area is likely to revise the size of the ICA and serve to reduce the number of properties impacted. It should be noted that the prohibition policies NASM-3, NASM-4, WST-3 and LIV-2 remains in place to protect the WHPAs from the application, handling and storage of Non-Agricultural Source Materials, the application of untreated septage and the use of the land as an outdoor confinement or farm-animal yard respectively.

Staff and the Committee need to develop a methodology with thresholds for the delisting and new listing of an ICA. Ongoing monitoring data will serve to determine whether the threat is reduced over time. Staff should continue to monitor trends to assess the efficacy of the existing policies. Levels at the Davidson wells are consistently between 2.8 and 4.3 mg/L with some seasonal fluctuations.

Sodium and chloride trends in several municipalities in the CTC, conversely remain persistent using a regression analysis approach and increasing using non-parametric Manns Kendall or GAMMs statistical approaches. These latter approaches are said to be more suitable (accurate)

with these data. Different statistical approaches for future assessments are currently under discussion with CTC Municipalities. Levels over the last decade show trends increasing in Halton Region with spikes over 200 mg/L (Cedarvale 4A well) at times in the spring. In the Orangeville Drinking Water system, five wells were identified with chloride issues and three wells with sodium issues. It has been reported that the chloride levels in three wells continue to rise (two stabilized) while sodium continues to rise in the three sodium issue wells. In Georgetown, the three wells that were identified with chloride issues, concentrations are on the rise. (CTC Source Protection Region, 2023b; see page 8). Increasing trends within the CTC are consistent with sodium and chloride trends reported in regional studies (impacts determined to be mainly from de-icing salt application and storage).

Other than the annual trend analyses required by policy for ICAs identified in the inaugural SPP, there is no policy under the Plan, that directs Municipalities to review drinking water system trends at specific intervals to identify additional issues. Policy Gen-7 directs the municipality to investigate and report when an increasing or decreasing trend is observed but annual trend analysis for issues identification is not directed. If the monitoring is not conducted with enough samples for statistical validity, trends may not be observed under current policy direction. Policy Sal-13 requires the municipality to share their sodium and chloride data with the Source Protection Authority where the application, handling and storage of road salt is or would be a moderate or low threat for the SPA to assess the trends but again, this does not require the municipality to increase monitoring for the purpose of trend analysis.

Additionally, there are no general conditions under the Municipal Drinking Water permits under the *Safe Drinking Water Act, 2002* that require trend analyses over time. Unless there is a special order attached to a drinking water permit, annual reporting consists of microbiological (presence/absence and min/max), operational and chemical (exceedance of the standard) test results. Several hundred samples are required for microbiological parameters but generally only 1-2/year for operational and chemical parameters. There are exceptions, at specific wells, where the full suite of general chemistry parameters is sampled up to four times per annum, e.g., Orangeville Wells 7, 10 and 11 (pursuant to the Safe Drinking water Act O. Regulation 169/03: Ontario Drinking Water Quality Standards and the direction of the Medical Officer of Health). Within CTC SPR, trend analyses are currently only driven by the policies under the Source Protection Program and currently only apply to the 2015 established ICAs. Municipalities, of course, keep track of water quality trends to ensure safety as they are accountable and responsible for the quality of the drinking water that they provide to residents. Discussions revealed that the CTC municipalities consistently exceed the drinking water permit monitoring requirements and are vigilant with the review of ongoing trends. CTC staff are working with the municipalities to develop automated analytical tools for trends. These tools may require additional monitoring data. A policy update of SAL-9 (complemented by a new GEN-10 to direct the SPA to perform the analyses) may be useful in supporting such action. The delineation of ICAs should also be governed by a new methodology (to be developed by staff), that is inclusive of thresholds and timeline projection guidelines to the established Ontario Drinking Water Quality Standards. This will serve to support the listing and delisting of ICAs in the future.

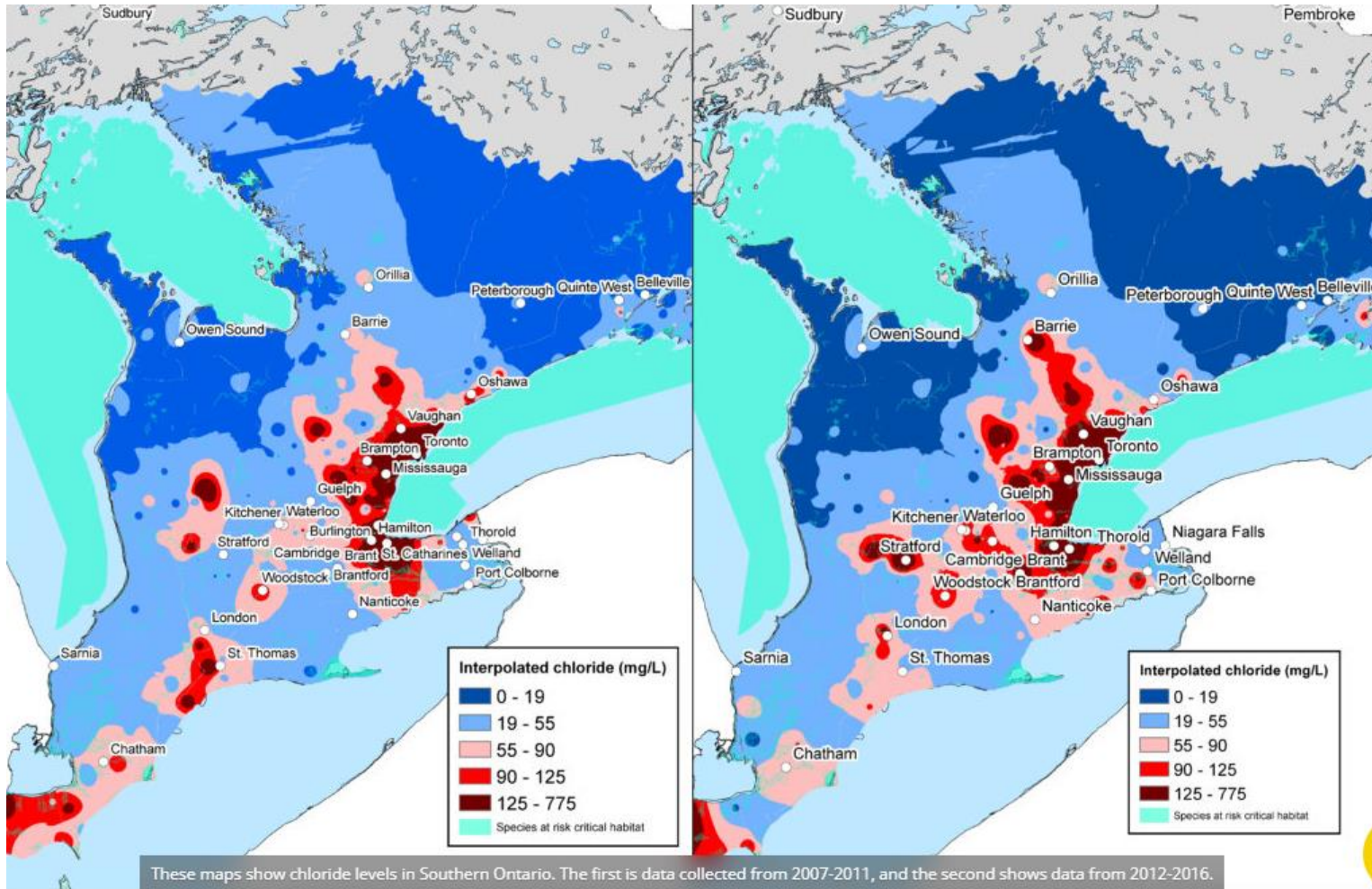


Figure 4. Salt densities in the GTA – World Wildlife Fund media release June 19, 2019. (WWF, 2019)

2 Discussion

2.1 Section 36 Task 9 Considerations

There are numerous factors promoting the review of Issues that were determined during the development of the CTC's inaugural Source Protection Plan.

- a) As noted, Section 36 direction from the Province dictated an update of the Source Protection Plan. Items were identified by the SPC and a workplan was developed and approved. Future Section 36 orders from the Province will likely be discontinued in favour of ongoing Section 34 updates. The approved 2018 Section 36 workplan listed the review of the inaugural ICA policies as a task.
- b) Updated Technical Rules and circumstances can change the way one might assess an issue. The Technical Rules were updated in 2017, 2018 and 2021. This paper is intended to examine and answer where possible the following questions:
 - 1) Are the current CTC SPP ICA policies adequate to meet the SWP goal of cessation of Drinking Water threats (efficacy of existing policies)?
 - 2) Are there gaps in the current ICA policies (such as exemptions)?
 - 3) Do the updated Technical Rules introduce new methodologies or circumstances that could result in additional or new threats (and thus require new/updated policies)?
 - 4) Is there a need to review Municipal Drinking Water reports to identify emerging trends, and should policies be developed to ensure periodic review and new policy development as needed?

This paper will discuss the nitrate issue but focus on Sodium and Chloride policies given the results of trend analyses.

1) Efficacy of existing SPP ICA policies

Sodium and Chloride

Existing CTC Sodium and Chloride policies: GEN-6 and 7, SWG-6 to 10 and 19 SAL-1-13, SNO-1, REC-1. This paper will focus on the SAL 1-SAL 13 policies as the application of deicing salts were determined to be the main source of trends in the CTC SPR.

Existing policies for the application of salt (SAL 1-SAL 13) are presented in the CTC SPP (pp. 114-123). These policies utilize Part IV, Land Use Planning, Specify Action, Education and Outreach and Monitoring instruments.

The policies apply to vulnerable areas (WHPAs/IPZs and ICAs) and specify public and private parking lots of >200sq metres, public and unassumed roadways. A 2013 Genivar Inc. study identified these areas as the key contributors to the trends.

Measures outlined in the policies include reduction of de-icing salt usage, the use of best management practices, requirements for trained contractors, salt management plans, as well as education and outreach programs (SAL-8) and monitoring (SAL-9). Licensing and accreditation programs for snow and ice contractors were also recommended for promotion by the Province and Municipal associations. SAL-6 has specific recommendations for the Ministry of Transportation, including the use of alternative methodologies and consultation with the SPA Assessment reports for current information related to ICA wells. SAL-10 to SAL-13 apply to moderate and low sodium and chloride threats (CTC Source Protection Committee 2022).

These policies have been in implementation for 5 to 7 years and where it may be too soon to determine the positive impact of all implemented policies, the CTC S36 workplan provides an opportune time to review the efficacy of these actions and consider revisions as necessary.

Trend analyses and monitoring reports show that Sodium and Chloride levels in groundwater and surface water are still increasing within the CTC and environs and projections indicate that these levels will continue to do so, because of continued and enhanced development growth and the expansion of supporting infrastructure. Extreme weather associated with climate change also serves to promote periodic but heavy use of de-icing salts to support road safety and manage liability. Monitoring Programs such as the CVC's Real Time Water Quality Monitoring Network, have reported sodium and chloride levels that are equal to ocean water in certain watercourses during some periods (Credit Valley Conservation 2021).

A Salt Management Plan report from the City of Toronto speaks to multiple operational practices and strategies aimed at "minimizing the amount of salt entering the environment by including best salt handling practices and new technologies to ensure its most effective use over the road system" (City of Toronto 2021). This Plan was developed to respond to the *Code of Practice for the Environmental Management of Road Salts* (2004) by Environment Canada. Salt use is reported by district from years 1999 to 2021 with data from some roads spanning

from 1986 to 2021. Generally, while some years reflect a reduction in salt use, this trend is not consistent and several years show an increase in volumes used in years with higher precipitation and lower temperatures. Years with higher average winter temperatures correlate with lower use of de-icing salt. The recorded salt application volume patterns appear to be more a reflection of overall warmer temperature trends coupled with extreme weather associated with climate change rather than the effect of Source Water Protection policies.

Local studies serve to support this hypothesis. Best Management Practices (BMPs) are updated on an ongoing basis with new techniques and materials being tested for use in test case scenarios. This Credit Valley Conservation analysis looked at data from local area municipalities within the Credit’s jurisdiction. It does appear that with more severe periods of precipitation associated with climate change, however, that increased salt application necessary during those periods, serve to counter the ‘smart about salt’ procedures and general efforts made to reduce salt. With many municipalities needing to rely on private contractors during heavy storm periods, BMPs may not be strictly adhered to during such critical weather events. Additionally, a 2013 study indicated that for Georgetown’s Cedarvale wells, “approximately 99% of the potential salt loading is estimated to come from winter road maintenance. An estimated 85% of the salt may come from private non-residential maintenance on commercial, industrial, institutional or multi-unit residential parcels” (Genivar 2013, p. 16). Similar loading estimates were reported in other Halton Region impacted wells.

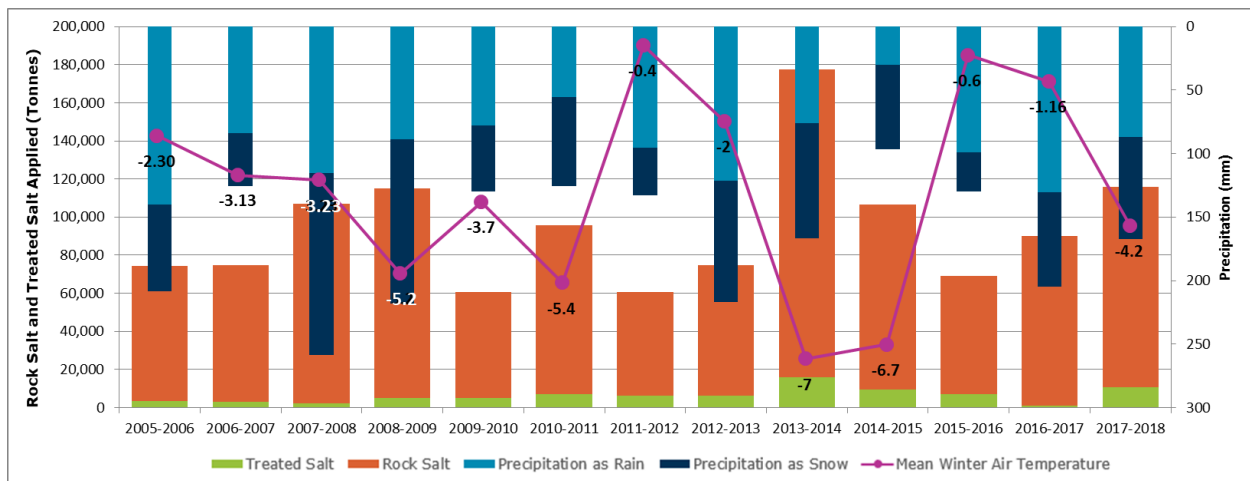


Figure 5. CVC Real Time Monitoring Network Salt/ Precipitation trends (Source: Credit Valley Conservation, Internal memo)

It can be seen in this graph, that years with lower temperatures coupled with higher precipitation (2013-2014), the volume of salt is higher. Higher temperatures correlate with lower salt volumes. The trend overall in salt application does not show a reduction. The use of treated salt (rock salt coated with performance enhancing liquids like calcium chloride), appears to have increased.

The Source Protection Program has fostered increased awareness, but competing public concerns coupled with limited resources and liability concerns, have served to dampen efforts to drive action on salt reduction. The City of Toronto 2021 Salt Management Plan indicates that “salt continues to be the most cost-effective de-icer across Canada”. It is not expected that current salting policies will have a significant impact in the reduction of salt trends, despite Education and Outreach, Smart about Salt and Conservation Ontario salt campaign efforts given the current rate of development and Provincial direction for increased growth in the CTC SPR.

New research has been promising but the products/solutions are still cost prohibitive or too energy intensive for widescale uptake. It has been discussed that until incentive programs that reduce liability for the use of alternative and or innovative methods to ensure safety but consider the environment are enacted, that no significant change will occur, and sodium and chloride in surface and ground water will continue to rise. It is also believed that such discussions must occur at a Provincial/Federal level and engage the Insurance industry. As an example, the State of New Hampshire in the U.S., after observing aggressive upward trends in the number of salt impaired water bodies with chloride levels exceeding 230 mg/L, had their New Hampshire Department of Environmental Services (MHDES) Green SnowPro Program snow and ice management professionals embark on training and certification in salt reduction practices to mitigate salt usage impacts to the environment. Commercial salt applicators certified under this program and those who hire them are granted liability protection against damages arising from insufficiencies or hazards when employing approved best management practices. The program applies to roads, parking lots and properties and records of property maintenance practices are required (New Hampshire Department of Environmental Services, n.d.).

Some SPRs have policies that require the Ministry of Transportation to provide annual de-icing salt volumes data to the SPA. It has been reported that these data generally only provide general approved rates and BMPs for the various sized roads. It is unknown whether the MTO consults with the CTC Municipalities regarding trends within the ICA wells (per SAL-6 clause d) for the use of alternative methods within the most vulnerable zones. No pilot project data (SAL-6 clause e) data has been forwarded to CTC SPR. It is also unknown whether any pilot projects have been conducted since the implementation of the CTC SPP or SPPs from nearby SPRs. Most SPRs with limited resources rely on the Province for engagement of other Provincial and Federal sources for funding to support these type of pilot projects.

Additionally, Risk Management Plans to manage the salt issue do not appear to be having the desired effect and take a great deal of municipal resources. Existing RMP policies focus on lots with as small as 5-7 parking spots. When a storm occurs, however, large quantities of salt are still applied (often by contracted third party operators), and there is no cost-effective way to ‘enforce’ the application rate targets that may be outlined in the RMP.

Several outstanding Sodium and Chloride (NaCl) Risk Management Plans remain in Halton Region. The cited reasons include a lack of engagement by the public and business owners alike, the inability to reach business owners who are not on site and live remotely (and do not

respond to mail), and limited municipal staff resources. As mentioned, studies indicate that private parking lots and unassumed roads account for the main source. SAL-1 and SAL-3 (Significant threats) and SAL-10 and SAL-12 (moderate/low threat) set requirements and limitations on these activities, but these provisions have proven to be difficult to implement, track and or enforce.

Municipal staff, nonetheless, support the current SPP and continue to press for the completion of these Plans. For some municipalities, lake-based sources to replace the impacted groundwater sources are seen as the most viable solution.

Halton Region has submitted a request for an extension from the current 2024 RMP completion date for an additional 2 years. Most of their outstanding existing threats (109 of 165 at the end of 2022) are for NaCl which represents the majority of outstanding RMPs. Outstanding RMPs for NaCl in the CTC also exist for Orangeville (28 of 34). Note that most other SPRs in the Province do not have a completion date for the completion of their Salt application and storage RMP policies.

Additional and stricter provisions and prohibitions may be necessary, and some recommendations are provided.

Recommendations

- 1) It has been suggested that the SPA and Municipal Education and Outreach (E&O) efforts have been inadequate to promote public and political recognition of the problem. It is believed that a broader more widescale Provincial effort involving more media is needed for broader understanding and for serious action to occur. A policy to prompt the MECP to engage in E&O campaigns targeting the public and private parking lot owners may be useful. The Municipality is encouraged to promote Source Water Protection goals and information across Municipal department with related operations (Edits to SAL-8).

The MECP has engaged the SPRs for feedback on how to improve the implementation of RMPs. CTC staff have been working with Conservation Ontario and other Source Protection Project Managers to coordinate a response which should include recommendations on RMPs amongst other things. Province wide education and outreach on Source Water Protection done by MECP/MTO is one of those suggestions. It is noted that S.97 of the *Clean Water Act 2006*, has provisions for Incentive and stewardship programs that could potentially be referenced as the mechanism.

- 2) It is understood that it is common practice for MTO and many municipalities to voluntarily provide salt application amounts to ECCC each year. It is recommended that this reporting also be circulated to the SPA. Although this data is not specifically reported for the source protection region, it will still be helpful long term trend comparison, and to assist the SPC in the development or revision of policy directed at Municipal Land use approvals.

Additionally, the MTO should be encouraged to review and consider the revision of bare pavement regain times for private parking lots and unassumed roads. A policy directed at the MTO may be considered. Such a policy may be complemented by guidelines for municipalities during the review and approval of development land applications. Edits to SAL-6.

- 3) The Province also needs to be engaged for broader scaled efforts with the Ministry of Transportation, the Insurance industry (Intact) and other stakeholders such as Landscape Ontario and Ontario Salt Pollution Coalition. Consider a policy clause to prompt the Province to engage the stakeholders to review the issue of liability as it relates to alternative methods and incentives in vulnerable areas. These discussions should consider incentives (liability credits/ exemptions) for more environmentally friendly methodologies and materials. Edits to SAL-5 and SAL-6.

Additionally, current policies are mainly directed at the Ministry of Transportation who manage provincial highways (SAL-6). Salt applied by the MTO would likely represent only a small percentage of overall salt applied in the SPR. It is therefore recommended that Municipalities who manage roads be also directed to take similar actions, if not already doing so.

- 4) Consider a Pilot project for Halton Region/Orangeville. The Trent Conservation Coalition SPR's inaugural SPP (2014) included a policy directed at the MTO to consider a pilot project utilizing new and mitigative technologies for road salt application within the Ganaraska Region SPA. While the Province was supportive of the Strategic policy, to date, no pilot project has been initiated by the MTO within this SPA. The MTO, however, provides BMP reports on new techniques such as 'pre-brining' of roads used in different areas, along with application rate data to the SPAs. These data and information have not proven very useful in the assessment of policy efficacy as it is difficult to determine if the policies have had any influence on the decisions made at the provincial level (MTO). Climate data also needs to be considered alongside such data for accurate assessment. Nevertheless, a policy to encourage a pilot(s) program(s) within the CTC is highly recommended.

A useful initiative is a 2018 guideline developed by Conservation Ontario with Municipalities, CAs, the MECP, ECCC and the Ontario Good Roads Association on environmental best practices to assist organizations managing road salt (Salt Vulnerable Areas Working Group, 2018). This document currently prioritizes certain areas where municipal drinking water sources are known to be impacted by road salt (ICAs) under the CWA, 2006. A Sustainable Technologies Evaluation Program (STEP) document (Van Seters, 2022) that looks at snow and ice control practices on parking lots and walkways developed by the TRCA presents several recommendations regarding best practices that may be useful in a pilot project. Additionally, it is recommended that the proposed pilot make use of existing numerical models to develop technical methodologies for the establishment of volume reduction targets within ICAs which may be expanded to other

WHPAs. Existing CTC SPP Strategic direction policies could be strengthened or replaced with more definitive and committed multiple agency work supported by a pilot in CTC ICAs/WHPA- 8 to 10 study, and reference to a living list of BMP documents. Edits to SAL-8.

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77 / 118 | 76% | sodium | 1/1

| the source protection authority. | | | | | | |
|----------------------------------|-----|----|-----|-----|--|-----|
| R-2(2) | MON | MC | MTO | E/F | The ministry shall prepare, by February 1 each year, an annual summary of the actions it has taken to achieve the outcomes of the source protection plan policies and make that report available to the applicable Source Protection Authority. Recommended contents of the report include, but are not limited to: a) A summary of any changes to the salt management plan identified in (1) made in the preceding calendar year. | N/A |

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Chapter 4: Policies

POLICY R-3 Applicable Area: groundwater ■ surface water ■

Applicable Activities: The application of road salt that is an existing significant drinking water threat or would be a future significant drinking water threat.

| Policy No. | Tool | Legal Effect | Implementer | E/F | Policy Text | Monitoring Policy |
|------------|------|--------------|-------------|-----|---|-------------------|
| R-3(1) | RES | S | MTO | E/F | Continue ongoing investigation and implementation of innovative practices and mitigative technologies regarding road salt application and the management of infiltration and runoff. | R-3(3) |
| R-3(2) | RES | S | MTO | E/F | Actively consider the creation of a pilot project utilizing new practices and mitigative technologies for road salt application or the management of runoff that could benefit drinking water sources within the Trent source protection areas. | R-3(3) |
| R-3(3) | MON | MC | MTO | E/F | The ministry shall prepare, by February 1 each year, an annual summary of the actions it has taken to achieve the outcomes of the source protection plan policies and make that report available to the applicable Source Protection Authority. Recommended contents of the report include, but are not limited to: a) The nature of relevant research initiatives as they arise; and b) A summary of relevant research activities every five years. | N/A |

Figure 6. Example policies from the Trent Conservation Coalition Source Protection Region (2014)

Nitrate

Existing CTC Nitrate policies: **Gen-6, WST-3, SWG-1-18, ASM-1-5, NASM-1-5, LIV-3, FER-4.** The CTC has one ICA for Nitrate in Acton/Georgetown. Currently, 39 of 203 RMPs (Halton Region) are outstanding (2022 data) for Nitrate related activities. The existing policies are complementary to existing Nutrient Management Plans that most farms already have. Septic inspections have also been implemented in the ICA areas by CTC Municipalities for necessary

upgrades. The current policies appear to be effective, and the trends show low or no increase. RMOs have not reported any major concerns with these policies.

Halton Region and CTC staff have met to review the updated statistical assessment of the nitrate concentration trends. There is general agreement that nitrate concentrations are stable and/or decreasing (Davidson wells 1 and 2), and therefore further discussions regarding the status of the ICA are recommended.

2) Gaps in the current CTC SPP policies

Sodium and Chloride

Since the inaugural 2015 CTC SPP, ongoing discussions at the SPC revolve around not just new systems and developing science but also the efficacy of existing policies and gaps for concerns that may have been missed under the tight deadlines to complete the Plan.

One such gap that has been repeatedly discussed is that of large residential developments and whether residential salt application exemptions are appropriate in areas with an ICA or highly vulnerable source protection areas. The Growth Plan, recent Bill 23: *More Homes Built Faster Act, 2022* as well as renewed action on development in the Greenbelt, are serving to promote more growth in Ontario with much of this growth occurring in the GTA. Current CTC policies do not relate to private residential properties considering that the individual salting practices to be too minor to cause an impact. Sub-division development, however, has become increasingly large and dense resulting in a collective impact that may represent a gap in the existing policies for de-icing salt application and storage. A map of new developments in the GTA from Living Realty Inc. shows the density of new residential developments within the GTA:

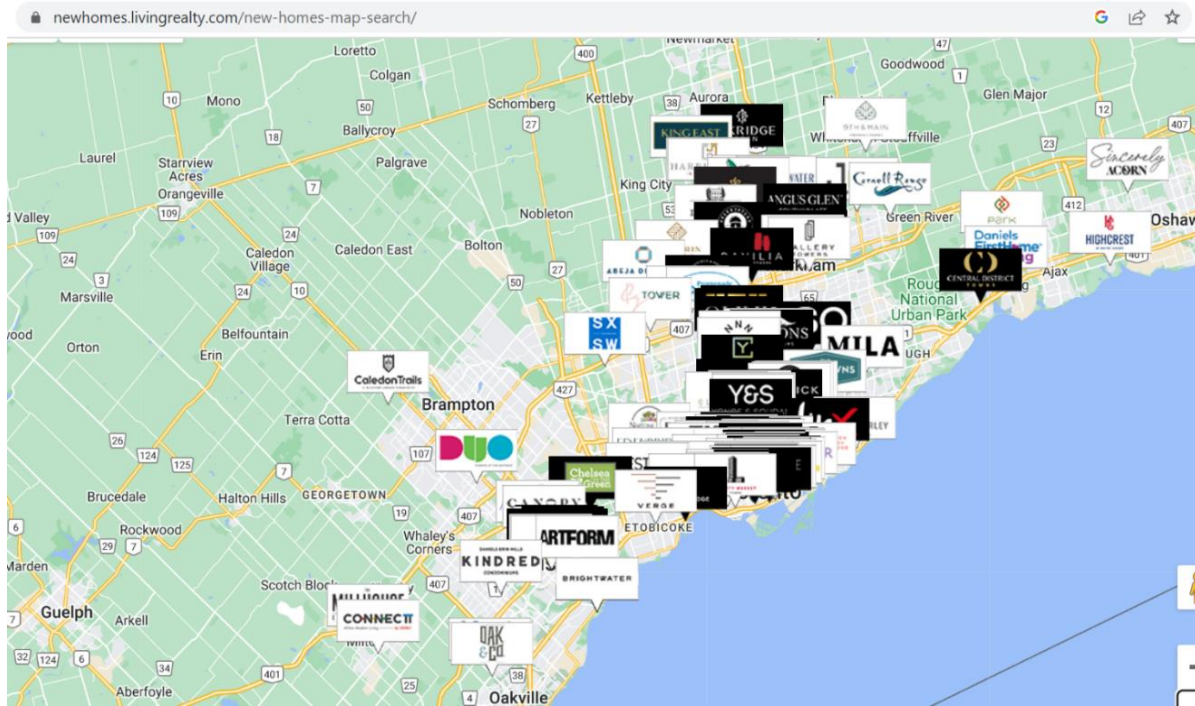


Figure 7. Map of new developments in the GTA from Living Realty Inc., 2023

Recommendations

- 5) Sodium and Chloride policy to govern large sub-divisions with privately owned parking lots greater than 200 square metres should be considered to address these potential impacts to ground and surface drinking water sources and or where the run-off may be directed to areas of infiltration that could impact WHPAs. It was discussed that private residences may be too difficult to manage or enforce and thus education and outreach programs as still the best way to address these concerns. Future policies to manage the private parking lots appear to be the best approach. Requiring proponents to consider established guidelines for design/retrofit of parking lots with winter maintenance in mind may be beneficial (e.g. <https://lsrca.on.ca/wp-content/uploads/2023/07/Parking-Lot-Guidelines-Salt-Reduction.pdf>).

Sodium and Chloride trends can benefit from Provincial leadership such as incentives for Best Management Practices and reduced liability insurance. A policy directed at the MECP/MTO requiring these discussions may be considered. Edits to SAL-1 and SAL-3

Nitrate

It is suggested that there is no need for Nitrate activity policy updates as trend analyses appear to demonstrate stable conditions though some analyses of long periods of data suggest a low increase. The trends indicate that levels are well below the ODWQS to 2051. Trend analysis discussions with the municipality are ongoing and staff are completing a technical report. It is recommended that methodology for delisting the ICA, complete with threshold and timeline

guidance materials, be developed to support future ICA listing or delisting designations. Halton Region and CTC staff have met to review the updated statistical assessment of the nitrate concentration trends. There is general agreement that nitrate concentrations are stable and/or decreasing (Davidson wells 1 and 2), and therefore further discussions regarding the status of the ICA are recommended.

3) 2021 Technical Rules/ Table of Drinking Water Threats updates

The Technical Rules, that are used to perform the technical work presented in the Assessment Reports that support the Source Protection Plans, were updated. As a result, a review of revised rules affecting the CTC ICAs had to be done.

The Tables of Drinking Water Threats have been amended by the Ministry of the Environment, Conservation and Parks over time and most recently, in 2021.

To determine whether a specific threat activity is subject to a policy, one must refer to the current edition of the [Tables of Drinking Water Threats](#) to understand if the activity meets the specific circumstances to be a significant drinking water threat. If the activity is taking place in an Issue Contributing Area and is releasing one of the chemicals identified in the Tables of Drinking Water Threats, the activity is a significant drinking water threat, regardless of vulnerability score (CTC Source Protection Committee, 2022, p.58)

Revisions 2021 regarding ICAs

- Rules 16, 47, 48, 58, 78.1, 115 and 116, related to cumulative impacts and the delineation of ICAs, now allow for these areas to be delineated as separate areas versus the previous requirement for them to be within a Well Head Protection Area, Intake Protection Zone or Highly Vulnerable Area. This rule change introduced flexibility, but municipalities are not mandated to change their existing ICAs unless scientific study determines that there is the need for the existing ICA to be revised (previous or emerging concerns documentation regarding the issue or delineation mapping). CTC municipalities have indicated no plan to make changes to the currently mapped CTC ICAs except where a new numerical model drives the need to adjust the ICA. Model update work has focused on the WHPAs (delineation and vulnerability scoring). Where a new ICA is to be introduced, municipalities must follow the new most recent Rules. York Region is currently preparing scientific work utilizing the new Rules for the delineation of a new ICA within its jurisdiction. Halton Region is also revising its numerical groundwater model in the area of Acton, and this is expected to result in a change to the Nitrate ICA.

Technical Rules: Impervious Surfaces – The application of de-icing salts

- The revised rules also require impervious surface mapping to be completed within ICAs. This work was done for the existing CTC ICAs. The CTC ICAs were delineated using land-

use and MPAC data. Sources for the issues were identified at a detailed level. Preliminary consultations with the CTC municipalities indicate some interest in updating and standardizing the existing impervious surface mapping in all vulnerable areas. Discussions are ongoing with standard methodologies under review. Newly identified issues *must* be analyzed and reported using the latest technical rules.

- Rule 16 (11) has changed the threshold densities for threats associated with Impervious surfaces. This rule is supported by vulnerability scores. The impervious surfaces density threshold has been lowered from > 80% to >30% for significant threats within WHPA vulnerable areas and >8% for IPZs and WHPA-Es.
- This means that a smaller road/ road network or smaller parking lots may be identified for de-icing salt policy application within certain vulnerability zones in WHPAs (10) and in WHPA – E and IPZs (9-10). All activities within an ICA that are deemed to contribute to the issue regardless of vulnerability scores, however, are significant threats. In the CTC, de-icing salts applied to roadways, and parking lots as well as ice/snow storage were identified as significant threats while water softeners were determined as low contributors to the ICAs. Thus, there is no change to threat counts within an ICA because of the changes in the Technical Rules. Other vulnerable areas would be impacted.
- Discussions with municipal staff indicate that no IPZ-ICAs are intended as the vulnerability scores are too low to trigger threats and the event based IPZ-3s currently identify activities that are threats based on tributary time of travel and Lake Ontario modelling.

Technical Rules: Non-Agricultural Source Material (NASM) circumstances

- The definition has removed Category 1 NASMs (leaf and yard waste) as a drinking water threat. NASM threat counts in ICAs may need to be reviewed to determine whether counts need to be removed. The revised circumstances focus on specific activities that pose a threat (such as sewage and pulp and paper biosolids). This was done to align with the *Nutrient Management Act, 2022*. No policy change is expected.
- No Technical Rules for Agricultural Source Materials (ASMs) were revised.

Recommendations

No updated or additional policies associated with CTC ICAs are recommended for the recent changes in the Technical Rules.

4) Municipal Water Trend Analyses

Even as Municipalities adhere to the strict monitoring conditions laid out in their Drinking Water Permits and are diligent with meeting and in most cases exceeding all drinking water

standards for health, operations and aesthetics, a review of existing policies has determined that there is no mechanism in the Source Protection Plan to trigger trend analyses of other than the existing ICA systems, for new or emerging issues. Additionally, consultation revealed that there are no conditions under the Municipal Drinking Water permits under the *Safe Drinking Water Act, 2022* that require regular trend analyses over time. Annual reporting consists of microbiological (presence/absence and min/max), operational and chemical (exceedance of the standard) test results. Several hundred samples are required under a drinking water permit for microbiological parameters but generally, only 1-2/year for operational and chemical parameters. Sampling frequency for raw water inorganic (chemical) and organic parameters is performed at least once every twelve months from a raw water supply that is surface water based, and at least once every thirty-six months from a raw water supply that is groundwater-based (CTC Source Protection Region, 2023a, p.4). Where it is acknowledged that several CTC municipalities exceed the monitoring requirements of their permits, trend analyses for Issues are currently only driven by the policies under the Source Protection Program and currently only apply to the 2015 established ICAs.

Drinking Water monitoring reports are submitted by the Municipalities to the Province. These reports contain the results of tests performed on raw, treated and distribution line samples of drinking water. The type, number and frequency of these tests is directed by the Province and outlined in the Municipal system drinking water permit. The Province (MECP) publishes an [annual report on drinking water](#) (2022), it is assumed using these data..

The 2022 report based on 519,000 municipal drinking water tests performed in 2021-2022, reported that 99.9% of those tests met the Ontario Drinking Water Quality Standards. The report mentioned action being taken on blue-green algal blooms and emerging issues such as PFAS and cyber security. The report did not speak to trends in sodium and chloride in Ontario's drinking water sources. Sodium and chloride are both chemical parameters that are reported under the Provincial Drinking Water Surveillance Program (DWSP) and both are listed as aesthetic parameters (Ministry of Environment, Conservation and Parks, 2022).

Municipalities monitor and manage their drinking water systems and are accountable for the provision of safe drinking water. They also adhere to Provincially established aesthetic standards and thus increasing trends in salinity would be a matter which would garner concern.

It is recommended that:

- 1) Municipalities update their sampling schedule of raw groundwater from municipal production wells to at least **four times per year** (i.e., one sample per season) for sodium, chloride, nitrate, and nitrite parameters, if not already doing so.
- 2) Municipalities consider updating their sampling schedule of municipal monitoring wells to at least **four times per year** (i.e., one sample per season) for sodium, chloride, nitrate, and nitrite parameters, if not already doing so.
- 3) Municipal production wells with an increasing parameter trend, and where the parameter concentration is above the half-MAC for any of the parameters: sodium, chloride, and/ or nitrate and nitrite, increase their sampling frequency to **monthly** for the parameter(s) that have

an increasing trend, if not already doing so. For reference, policy SAL-9(b) in the Approved Source Protection Plan CTC Source Protection Region (2022) directs the municipality to undertake monthly sampling of sodium and chloride parameters in raw water at affected wells within an Issue Contributing Area for Sodium or Chloride. It is recommended that SAL-9 be edited (monitoring in ICAs), and this policy be complemented by a newly proposed GEN-10 to direct the SPA to perform annual trend analyses for all Drinking Water Systems within the CTC SPR.

It is also recommended that the MECP be asked to provide all spill related sampling data where the spill could result in a significant threat to a drink water system for use in scientific study by the Municipality and or the Source Protection Authority. Edit – New GEN-9

Recommendations:

- 6) Updated mapping to support source determination analysis within moderate and low threat areas for sodium and or chloride should be done regularly (every 5 years). Edits to SAL-12
- 7) A policy requiring the annual review of indicator parameters for all Drinking Water System trends to support the delisting of existing ICAs and or the addition of new ICAs. This may require increased water quality monitoring in some municipalities for statistical validity. This should be accompanied by a new methodology complete with thresholds and projection timeline guidance materials for listing and de-listing of ICAs. Edits to SAL-9 (for ICAs). Complementary addition of GEN-10 (all Drinking Water Systems).

3 Summary of Recommendations for CTC Nitrate or Sodium/ Chloride ICA Policies.

1. A policy to prompt the MECP to engage in E&O campaigns targeting the public and private parking lot owners may be useful. The Municipality is encouraged to promote Source Water Protection goals and information across Municipal department with related operations. Edits to SAL-8.
2. A monitoring Specify Action policy directed at the ECCC, MTO, and municipalities for reporting of salt application volumes annually may be considered. Such a policy may be complemented by guidelines for municipalities during the review and approval of development land applications. Edits to SAL-6.
3. Consider a policy to prompt the Province (MTO) to engage the stakeholders to review the issue of liability as it relates to alternative methods and incentives in vulnerable areas. Edits to SAL-6. Also recommend adding text to address the responsibilities of the Municipalities that manage the local public roads. Suggest adding second part to SAL-6.

4. Consider a Specify Action Pilot project for Halton Region/Orangeville Edits to SAL-8. These practices may then be documented in a guideline to benefit other vulnerable areas within the CTC. The Province (MECP/MTO) may be solicited to support these efforts. This would include the use of technical methodologies such as numerical models to determine application target volumes, test BMPs and consider revised BPRTs (Bare pavement regain times).
5. To address future large subdivision salt application impacts, consider the prohibition of future parking lots in WHPA-A where there is an ICA for Sodium and or Chloride and restriction of parking lots not greater than 200 sq meters in WHPA-As NOT in an ICA and the rest of the ICA (as well as in any WHPA-B and E (VS 10 and 9 respectively). The areas listed where parking lots of 200 sq m or less may be located should require risk management plans that include salt management plans, codes of practice, licensed contractors, salt volume reporting, and by-laws to govern future owners and management corporations as conditions of approval for new developments. This is partially covered in recommendation 1 (SAL-1 edits directed at the RMO), to address main salt impact activity findings (85% parking lots and unassumed roads). Edits to SAL-3 are directed at the Planning Authority (conditions of approval for new developments). For existing ICAs, it is suggested that risk management plans for private parking lots (>200 sq m) and unassumed roads shall include salt management plans. Edits to SAL-1, SAL-2 are suggested. There is already a provision for a salt management plan in SAL-10 for mod/low threats.
6. A policy directed at the CTC Municipalities requiring updated mapping, water quality trends and source determination analysis within areas of moderate and low threat ICAs should be done regularly (every 5 years). New clause SAL-12.
7. A policy requiring the annual review of indicator parameters for all Drinking Water System trends to support the delisting of existing ICAs and or the addition of new ICAs. This may require increased water quality monitoring in some municipalities for statistical validity. This should be accompanied by a new methodology complete with thresholds and projection timeline guidance materials for listing and de-listing of ICAs. Edits to SAL-9 complemented by new proposed GEN-10

All drinking water systems (new proposed GEN-10) vs currently just existing ICAs (SAL-9) are suggested to be reviewed annually. A new methodology/ process for delisting (and listing) an ICA should be developed that is inclusive of thresholds and timeline projection guidelines to the established Ontario Drinking Water Quality Standards.

4 Conclusions

Sodium and Chloride issues (existing exceedances and or increasing trends) were identified in the CTC during its inaugural Assessment Report and Source Protection Plan. Issue Contributing Areas were delineated per the Technical Rules and special policies were developed for these areas. A Section 36 review of this matter has determined that despite ongoing implementation practices to manage the contaminant sources, and several education and outreach program to raise awareness, volumes of salt being applied continues to rise within the CTC. Contaminant trends from primarily de-icing salt application (especially on private parking lots and unassumed roads), handling and storage activities also continue to rise even with strong Provincial and municipal efforts for best management practices and excellent tools such as the [Good Roads Association tool for salt use management](#). It was discussed that often staff of different municipal departments are not aware of Source Water Protection policies or have not been provided with source protection information and guidance for their business areas, resulting in gaps in the protection of the resource. Another key concern is that a municipality must balance public safety with potential harm to the environment with no credit for the use of typically more expensive innovative methodologies. Consideration of these matters has resulted in 8 recommendations for revised or new policies.

Nitrate trends in the CTC have remained stable. It appears that Source Protection Plan policies along with other instruments and outreach activities are having a positive effect.

This document is presented as support for the SPC Implementation Working group and SPC discussions and deliberations regarding ICA policies. Staff will take feedback and direction from both groups and following consult broader with approval from the SPC as part of the CTC S.36 workplan Item 9.

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