# Considering the Transferability of the New Hampshire Model for Limited Liability Protection for Winter Maintenance Contractors to Ontario, Canada

By

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**Executive Summary:**
Freshwater salinization of Canada's surface and groundwaters has been an ongoing challenge for decades. While there are numerous contributors to freshwater salinization, including agricultural fertilizers and wastewater, winter application of road salts are the dominant driver throughout northern temperate regions such as southern Ontario and Quebec. Historically, Canada's attempts to reduce salt use have been voluntary in nature, and resulted in limited short-term success.

This policy brief considers the ongoing voluntary liability protection policy in the State of New Hampshire in the United States as a pathway to achieving meaningful reductions to road salt use, and chloride loading to surface and groundwater in Ontario. This document describes the background, development and implementation of the New Hampshire policy, and potential improvements to the policy and associated training program which could facilitate measurable improvements in surface and groundwater quality where such policies exist.

**Introduction:**
Approximately 2.5 million Ontarians rely on groundwater for drinking water[1]. An additional 1.15 million Canadians fish Ontario's freshwaters each year, contributing approximately 1.75 billion dollars to the provincial economy[2]. Commercial fishing contributes an additional 230 million dollars annually, through 600 commercial licenses[3]. The importance of groundwater drinking water sources and freshwater fish habitat to Ontario underscores the importance of addressing the accumulation of chloride from winter-applied road salts in the province.

Road salts have been used across Ontario's urban centres to melt snow and ice on paved surfaces since the 1940s[4]. Ontario's annual road salt demand is currently approximately 2-3 million tonnes[4, 5]. Road salt dissolves easily in water, dissociating to sodium (Na) and chloride (Cl) ions [6]. Chloride is then primarily transported through storm sewers to streams, lakes and wetlands[7, 8], however can also be transported over permeable surfaces and percolate to groundwater, where it can take weeks, months, or years to travel through subsurface pathways to enter surface waters again[9, 10, 11, 12]. Chloride presents numerous adverse effects to aquatic ecosystems, most notably in their impacts to zooplankton[13, 14], which threatens species at higher trophic levels, such as fish[15]. Chloride additionally results in corrosion of transportation infrastructure[16, 17], automobiles[18], and even drinking water infrastructure[19, 20].

High chloride can result in a salty taste to drinking water, such that Health Canada has developed an aesthetic guideline of 250 mg/L for chloride in drinking water[21]. High sodium in drinking water can result in exacerbation of hypertension, and Health Canada has set its drinking water standard for sodium at 200 mg/L[22]. The Canadian Council of Ministers of the Environment have also set guidelines for chronic (long-term, indefinite) and acute (short-term, 4-hour) exposures of aquatic life to chloride at 120 and 640 mg/L respectively[23]. These guidelines are regularly exceeded by an order of magnitude in both surface and groundwaters throughout all months of the year in many of Ontario's urban regions[24, 25].

**Canadian Winter Maintenance/Salt Policy Landscape:**
Canada has recognized the harmful impacts of chloride on aquatic species for several decades. This recognition resulted in the development of the Syntheses of Best Practices for the Application of Road Salt by the Transportation Association of Canada in 1999[25], and the Code of Practice for the Environmental Management of Road Salts by Environment and Climate Change Canada in 2004[26]. Both of these documents outlined the best management practices for

managing road salt use and storage, training, and low-salt design[26, 27]. The Code of Practice also established targets for adoption of various measures relating to salt management, however there was no incentive for municipalities to adopt them, and progress towards these targets has been variable and declining in recent years[5, 27].

In Ontario, winter road maintenance is governed by the Minimum Maintenance Standards[28] under the 2001 Municipal Act[29]. These include the thresholds for snow accumulation that trigger winter maintenance (e.g., snow plows and salt application) on roads, sidewalks, and as of 2018, bicycle lanes[30]. In 2013, the MMS were adjusted to account for the need to minimize the risk to the public presented by ice formation on public paved surfaces, with the language in the MMS indicating that municipalities have a duty to act if they reasonably suspect ice formation may occur[31]. This adds additional pressure on public winter maintenance operators to use additional salt[32].

There is no specific threshold for maintenance of parking lots or other private property, however the Ontario Occupier's Liability Act indicates that property owners may pass liability for slip and fall claims to their winter maintenance contractors if there is a breach of contract[33]. As such, winter maintenance contractors are generally required to apply excess road salt to minimize their legal liability, and will regularly conduct a follow-up application upon request[32]. In spite of these contractual obligations which drive excess salt application, the frequency of legal claims continues to drive increasing insurance premiums in Ontario for both municipalities and contractors[32, 34]. This has led to the closure of many winter maintenance contracting companies, and subsequently, the rising costs to hire winter maintenance contractors in Ontario[34, 35]. Resultingly, municipalities are finding it difficult to contract various services they require, and thus are increasingly in-sourcing operations at greater expense[32].

**The New Hampshire Model:**

The State of New Hampshire (NH) in the United States developed and implemented a limited liability protection policy for winter maintenance contractors in 2013, under RSA 508:22, to facilitate the expansion of Interstate-93 (I-93) and mitigate additional chloride loading from the increased road length[36]. RSA 508:22 describes the requirements for record keeping and reporting of salt use by winter maintenance contractors in the state[36]. Complementary to this, RSA 489-C established legislative guidelines for administering training and certifications under the NH DES's Green Snow Pro training program, in exchange for liability protection against slip and fall claims[37]. These statutes were revised in 2021 to extend liability protection to municipalities as well[36, 37].

The NH Department of Environmental Services (DES) is responsible for administering training through third-party educational (e.g., University of New Hampshire) and non-profit institutions (e.g., Snow and Ice Management Association (SIMA), Smart About Salt Council) for a small fee to the organization administering the training, and certifications through the NH DES for an additional nominal fee to the NH DES[38, 39]. Both of these fees are intended to be affordable for organizations of all sizes, and are solely used for cost recovery. Training is administered as a full course, taken every 6 years (i.e., before year 1, and in year 6), with biannual refresher courses in years 2 and 4[38, 39]. For larger private organizations, they can apply to have one of their staff certified as an approved trainer, and can then administer the training within their company to reduce training costs[38]. Similarly, certification costs are waived for more than 4 subordinate trainees within a given company[38].

RSA 489-C and the liability protection have been tested multiple times in court, most recently in 2022[40]. Following the lawsuit, it was found that the NH DES can continue to operate the training program, and that the statute does provide liability protection to contractors and municipalities. Liability protection is only rescinded in cases of gross negligence wherein the contractor does not adhere to the signed contract between themselves and the property owners. Despite continued success of the liability protection policy and training programs, the NH DES has been experiencing several ongoing challenges. Notably, initial adoption of the Green Snow Pro certification was limited in early years, with less than 50 certificates granted in the first year; this has since grown to over 700 certificates administered each year as of the 2024-25 season. The other major challenge facing the program is the lack of certification among companies that cater to large property management firms (e.g., big-box stores, large real estate corporations managing multiple condominium properties), which are generally headquartered outside of NH, and therefore are not engaged in, or aware of, the Green Snow Pro certification program.

**Policy Options:**

1. **Business as usual (do nothing):** Under a business-as-usual scenario, the winter maintenance industry would continue to apply road salt at the rates they feel will best minimize their legal liability. Under this scenario, winter maintenance contractors would continue to face increasing insurance rates associated with the rising costs of legal fees and litigation of slip-and-fall claims, further exacerbating the issues of high insurance rates that have been driving contractors out of the industry in recent years[34, 35]. This would result in no change to ongoing freshwater salinization, which would increase in step with urban growth[24, 41, 42]. This would exacerbate threats to drinking water sources in urban regions reliant on groundwater, such as the Kitchener-Waterloo, Guelph, and Ottawa regions[42] and further impair coldwater fisheries in the province[15].

2. **Voluntary limited liability protection (New Hampshire Model):** The Province of Ontario could implement a new voluntary framework for limited liability protection, using the New Hampshire policy as a model. This would involve establishing legislative authority of a provincial Ministry, such as the Ministry of Environment, Conservation and Parks to administer a certification for winter maintenance contractors and/or municipalities. This legislation would establish the ability for contractors and municipalities to seek accredited training programs, such as those administered by approved educational institutions (e.g., colleges and universities) or non-profit organizations (e.g., Smart About Salt Council). Legislation would also describe the frequency of training and evaluations for maintaining certifications (e.g., full course and exam every 6 years, with shortened bi-annual refresher courses), the standards for record retention to be eligible for liability protection (e.g., precipitation rate, accumulation, surface and air temperatures, time of day) and the reporting requirements for salt use to different paved surfaces (e.g., application rates, total annual amounts, number of individual and follow-up applications) and the approximate area of paved surface receiving treatment. This would be more onerous than the current New Hampshire data requirements which only extend to total annual salt use, but would improve tracking of program effectiveness for reducing salt use.

3. **Voluntary limited liability protection with community engagement (New Hampshire Model +):** This option represents an improvement over the existing New Hampshire Model, which retains all the features of the New Hampshire Model but also makes additional

investment in engaging with the general public (e.g., children and adults of all ages) to increase awareness of the issue of chloride from road salt, as well as with commercial property owners and management firms in Ontario to showcase the benefits of limited liability protections for contractors in Ontario who maintain a current certification under a Government of Ontario accredited training program for winter maintenance operators. Efforts to engage property managers could market this program as an opportunity for improved sustainability, and a step toward the net-zero operations within the corporation. Such an engagement campaign should note that reduced expenditure on road salt will free up resources for addressing any deficiencies in property drainage that lead to ice formation (e.g., areas for water to pool, downspouts that discharge to paved areas) in keeping with the principles of low-salt design, or fund other sustainability initiatives. A successful public engagement campaign would address present challenges within the New Hampshire Model, wherein large commercial properties do not hire certified contractors, and remain unengaged with the local winter maintenance industry in New Hampshire.

4. **Voluntary limited liability protection with community engagement and operations modernization fund (New Hampshire Model ++):** Finally, this option describes a more ideal implementation of the New Hampshire Model, wherein the State facilitates third-party training to ensure the winter maintenance industry knows how to reduce salt, a State-level legal framework to provide liability protection and incentivize reduced salt use, in addition to public engagement to increase certification rates among the industry. One final step that could strengthen the effort to reduce salt use is to disincentivize excess salt use by adding a surcharge to every tonne of salt purchased in the province. The funds raised from this surcharge could be used to fund a winter maintenance modernization program, wherein certificate holders could apply for funds to improve their salt application equipment (e.g., groundspeed controllers, modern spreader controllers, brine production and application equipment, data management and decision making support software). This would further incentivize winter maintenance contractors and municipalities to participate in the certification process and reduce salt application. Funding applications could include requirements to establish a reasonable need for funding, have maintained current certification in good standing for a set number of years, and be limited in maximum amount based on specific categories.

**Conclusions and Recommendations:**

Chloride from road salt has extensive impacts on freshwater aquatic species, most notably the keystone species responsible for providing a food source to higher order organisms such as fish. With the impacts to surface and groundwater quality, chloride also presents a future risk to availability of drinking water in some of Ontario's major urban centres. To best protect Ontario's freshwater resources both above and below ground, it is recommended that:

1. The Government of Ontario should immediately adopt the New Hampshire Model of limited liability protections for winter maintenance contractors and municipalities, including:
    a. Establish a steering committee of public and private sector experts, including provincial and municipal government, academia, non-profit, environmental, insurance and winter maintenance industry representatives to develop an accredited training program.

   b. Partner with universities, colleges, and non-profit organizations (e.g., Smart About Salt Council) to administer training both in-person and online (i.e., asynchronous) for both a full training program to be taken every 4-6 years, and a shortened, refresher training program to be taken annually; each program should include an appropriate evaluation (e.g., written exam).
   c. Require annual reporting of salt use, approximate average application rates to different paved surfaces, the approximate areas of different paved surfaces maintained, and the number of winter salting events they have (individual and follow-up service) to help understand how salt use changes over time. This would facilitate improved evaluation of program performance.
   d. Partner with the state of New Hampshire and other industry stakeholders across North America's snowbelt to develop an evaluation framework for these programs to ensure that programs are being reviewed to identify any challenges and opportunities for continuous improvement, and drive reductions in salt use.
2. The Government of Ontario should additionally increase public engagement to improve understanding of the issues and best practices for residential and commercial road salt use amongst property owners and managers, marketing this as a tool to improve commercial operational sustainability.
3. The Government of Ontario should evaluate the appropriate surcharge to be applied per tonne of salt purchased for use in Ontario, which should fund data and fleet modernization for public and private sector winter maintenance fleets.
4. The Government of Ontario should pair the above recommendations with investment in expanded environmental monitoring for key watersheds across participating municipalities to quantify changes in chloride loading to streams to support an evaluation of a limited liability protection policy.

**References:**


1. Ontario Ministry of Agriculture, Food and Agribusiness. (2024). Locating existing water, gas or oil wells. Retrieved from: https://www.ontario.ca/page/locating-existing-water-gas-or-oil-wells.
2. Hunt, L.M., H. Ball, A. Ecclestone and M. Wiebe. 2022. Selected results from the 2020 recreational fishing survey in Ontario. Ontario Ministry of Natural Resources and Forestry, Science and Research Branch, Peterborough, Ontario. Science and Research Technical Report TR-50. 33p. Retrieved from: https://files.ontario.ca/mnrf-2020-recreational-fishing-survey-results-en-2023-06-14.pdf.
3. Ontario Ministry of Natural Resources. (2023). Commercial Fishing. Retrieved from: https://www.ontario.ca/page/commercial-fishing.
4. Morin, D., & Perchanok, M. (2000). Road Salt Loadings in Canada.
5. Environment & Climate Change Canada (ECCC). (2023). Review of Progress: Code of Practice for the Environmental Management of Road Salts 2014-2019. Retrieved from: https://publications.gc.ca/site/archivee-archived.html?url=https://publications.gc.ca/collections/collection_2023/eccc/En14-54-2023-eng.pdf.
6. Mason, C. F., Norton, S. A., Fernandez, I. J., & Katz, L. E. (1999). Deconstruction of the chemical effects of road salt on Stream Water Chemistry. *Journal of Environmental Quality*, *28*(1), 82–91. https://doi.org/10.2134/jeq1999.00472425002800010009x.
7. Betts, A., Gharabaghi, B., McBean, E., Levison, J., & Parker, B. (2015). Salt vulnerability assessment methodology for municipal supply wells. *Journal of Hydrology*, *531*, 523–533. https://doi.org/10.1016/j.jhydrol.2015.11.004.
8. Helmueller, G., Magnuson, J. J., & Dugan, H. A. (2019). Spatial and temporal patterns of chloride contamination in a shallow, Urban Marsh. Wetlands, 40(3), 479–490. https://doi.org/10.1007/s13157-019-01199-y.
9. Kornelsen, K. C., & Coulibaly, P. (2014). Root-zone soil moisture estimation using data-driven methods. *Water Resources Research*, *50*(4), 2946–2962. https://doi.org/10.1002/2013wr014127.
10. Cunningham, M. A., Snyder, E., Yonkin, D., Ross, M., & Elsen, T. (2008). Accumulation of deicing salts in soils in an urban environment. *Urban Ecosystems*, *11*(1), 17–31. https://doi.org/10.1007/s11252-007-0031-x.
11. Howard, K. W., & Beck, P. J. (1993). Hydrogeochemical implications of groundwater contamination by road de-icing chemicals. Journal of Contaminant Hydrology, 12(3), 245–268. https://doi.org/10.1016/0169-7722(93)90010-p.
12. Hamilton, S.K. (2011). Biogeochemical time lags may delay responses of streams to ecological restoration. Freshwater Biology, 57, 43–57. DOI: https://doi.org/10.1111/j.1365-2427.2011.02685.x.
13. Arnott, S. E., Celis-Salgado, M. P., Valleau, R. E., DeSellas, A. M., Paterson, A. M., Yan, N. D., Smol, J. P., & Rusak, J. A. (2020). Road salt impacts freshwater zooplankton at concentrations below current water quality guidelines. Environmental Science & Technology, 54(15), 9398–9407. https://doi.org/10.1021/acs.est.0c02396.
14. Hintz, W.D., Arnott, S.E., Symons, C.C., Greco, D.A., McClymont, A., Brentrup, J.A., Cañedo-Argüelles, M., Derry, A.M., Downing, A.L., Gray, D.K., Melles, S.J., Relyea, R.A., Rusak, J.A., Searle, C.L., Astorg, L., Baker, H.K., Beisner, B.E., Cottingham, K.L., Ersoy, Z., … Weyhenmeyer, G.A. (2022). Current Water Quality Guidelines across North

America and Europe do not protect lakes from Salinization. Proceedings of the National Academy of Sciences, 119(9). https://doi.org/10.1073/pnas.2115033119.

15. Lomartire, S., Marques, J. C., & Gonçalves, A. M. M. (2021). The key role of Zooplankton in ecosystem services: A perspective of interaction between zooplankton and fish recruitment. Ecological Indicators, 129, 107867. https://doi.org/10.1016/j.ecolind.2021.107867.
16. Křivý, V., Kubzová, M., Konečný, P., & Kreislová, K. (2019). Corrosion processes on weathering steel bridges influenced by deposition of de-icing salts. *Materials*, *12*(7), 1089. https://doi.org/10.3390/ma12071089.
17. Kelting, D. L., & Laxson, C. L. (2008). Review of Effects and Costs of Road De-icing with Recommendations for Winter Road Management in the Adirondack Park. (AWI2010-01). Retrieved from: https://www.researchgate.net/profile/Daniel_Kelting/publication/242549104_Review_of_Effects_and_Costs_of_Road_De-icing_with_Recommendations_for_Winter_Road_Management_in_the_Adirondack_Park/links/54dafda30cf261ce15cec474.pdf.
18. Willmert, H. M., Osso, J. D., Twiss, M. R., & Langen, T. A. (2018). Winter Road management effects on roadside soil and vegetation along a mountain pass in the Adirondack Park, New York, USA. Journal of Environmental Management, 225, 215–223. https://doi.org/10.1016/j.jenvman.2018.07.085.
19. Larson, T. E., & Skold, R. V. (1958). Laboratory studies relating mineral quality of water to corrosion of steel and cast iron. *Corrosion*, *14*(6), 43–46. https://doi.org/10.5006/0010-9312-14.6.43.
20. Stets, E. G., Lee, C. J., Lytle, D. A., & Schock, M. R. (2018). Increasing chloride in rivers of the conterminous U.S. and linkages to potential corrosivity and lead action level exceedances in drinking water. *Science of The Total Environment*, *613-614*, 1498–1509. https://doi.org/10.1016/j.scitotenv.2017.07.119.
21. Health Canada. (1987). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Chloride. Retrieved from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-chloride.html.
22. Health Canada. (1992). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Sodium. Retrieved from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-sodium.html.
23. Canadian Council of Ministers of the Environment (CCME). (2011). Canadian water quality guidelines for the protection of aquatic life: chloride. In: Canadian Environmental Quality Guidelines, Winnipeg, Canada. Retrieved from the CCME Website: http://ceqg-rcqe.ccme.ca/download/en/337/.
24. Weatherson, W. O. W., Oswald, C. J., & Roy, J. W. (2024). High-frequency data provides insight into chloride transport pathways and exceedances of chronic chloride guidelines for the protection of aquatic life in streams impacted by deicers. ACS ES&T Water, 4(6), 2445–2457. https://doi.org/10.1021/acsestwater.3c00780.
25. Oswald, C. J., Giberson, G., Nicholls, E., Wellen, C., & Oni, S. (2019). Spatial distribution and extent of urban land cover control watershed-scale chloride retention. *Science of The Total Environment, 652*, 278–288. https://doi.org/10.1016/j.scitotenv.2018.10.242.

26. Transit Association of Canada (TAC). (1999). Syntheses of Best Practices for Road Salt Management.
27. Environment & Climate Change Canada (ECCC). (2004). The Code of Practice for the Environmental Management of Road Salts. Ottawa. Retrieved from: https://canadagazette.gc.ca/rp-pr/p1/2004/2004-04-03/pdf/g1-13814.pdf.
28. Minimum Maintenance Standards for Municipal Highways, O. Reg. 239/02. Retrieved from: https://www.ontario.ca/laws/regulation/020239.
29. Municipal Act, 2001. S. O. 2001, c. 25. Retrieved from: https://www.ontario.ca/laws/statute/01m25#BK140
30. Minimum Maintenance Standards for Municipal Highways, O. Reg. 366/18. Retrieved from: https://www.ontario.ca/laws/regulation/r18366.
31. Minimum Maintenance Standards for Municipal Highways, O. Reg. 47/13. Retrieved from: https://www.ontario.ca/laws/regulation/r13047.
32. Weatherson, W. O. W., Goitom, E., Oswald, C. J., Thompson, W., Strong, P. (2025). Assessing Municipal Perspectives on Winter Maintenance and the Changing Climate in the Lake Simcoe basin. Bolton-Menk 26th Annual Salt Symposium.
33. Occupiers' Liability Act, 1990. R. S. O. 1990, c. O-2. Retrieved from: https://ontario.ca/laws/statute/90o02.
34. Gould, L. (2022). Let's make our voices heard. Retrieved from: https://landscapeontario.com/lets-make-our-voices-heard.
35. Agg, J. (2023). Gaining momentum in the snow insurance crisis. Retrieved from: https://landscapeontario.com/gaining-momentum-in-the-snow-insurance-crisis
36. New Hampshire Actions, Process, and Service of Process, N.H. Rev. Stat § 508:22. (2022).
37. New Hampshire Water Management and Protection, N.H. Rev. Stat § 489-C. (2022).
38. New Hampshire Department of Environmental Services (NH DES). (n.d. a). Commercial Green Snow Pro Certification. Retrieved from: https://www.des.nh.gov/land/roads/road-salt-reduction/green-snowpro-certification.
39. New Hampshire Department of Environmental Services (NH DES). (n.d. b). Municipal Green Snow Pro Certification. Retrieved from: https://www.des.nh.gov/land/roads/road-salt-reduction/municipal-green-snowpro-certification.
40. Boyle Shaughnessy. (2022). Statutory Limited Liability for Snow and Ice Maintenance - Defense Verdict. Retrieved from: https://www.boyleshaughnessy.com/firm-news/statutory-limited-liability-for-snow-ice-maintenance-defense-verdict/.
41. Mazumder, B., Wellen, C., Kaltenecker, G., Sorichetti, R. J., & Oswald, C. J. (2021). Trends and legacy of freshwater salinization: Untangling over 50 years of stream chloride monitoring. Environmental Research Letters, 16(9), 095001. https://doi.org/10.1088/1748-9326/ac1817.
42. Sorichetti, R.J., Raby, M., Holeton, C., Benoit, N., Carson, L., DeSellas, A., Diep, N., Edwards, B.A., Howell, T., Kaltenecker, G., McConnell, C., Nelligan, C., Paterson, A.M., Rogojin, V., Tamanna, N., Yao, H., & Young, J. D. (2022). Chloride trends in Ontario's surface and Groundwaters. Journal of Great Lakes Research, 48(2), 512–525. https://doi.org/10.1016/j.jglr.2022.01.015.