A sidewalk with snow on it

Description automatically generated

**Road Salt-Related Research Conducted in the Lake Champlain Basin**

Adirondack Road Salt Reduction Task Force. 2023. Final Report – Assessment and Recommendations. Available at: <https://dec.ny.gov/environmental-protection/water/adk-salt-reduction-task-force>

Adirondack Road Salt Reduction Task Force. 2023. Background and Technical Appendix. Available at: <https://dec.ny.gov/environmental-protection/water/adk-salt-reduction-task-force>

Denner, J. C., Clark, S. F., Smith, T. E., & Medalie, L. (2010). Effects of Highway Road Salting on the Water Quality of Selected Streams in Chittenden County, Vermont, November 2005-2007. <https://pubs.usgs.gov/sir/2009/5236/>

Dugan, H. A., Bartlett, S. L., Burke, S. M., Doubek, J. P., Krivak-Tetley, F. E., Skaff, N. K., ... & Weathers, K. C. (2017). Salting our freshwater lakes. Proceedings of the National Academy of Sciences, 114(17), 4453-4458. <https://doi.org/10.1073/pnas.1620211114>

Dugan, H. A., Skaff, N. K., Doubek, J. P., Bartlett, S. L., Burke, S. M., Krivak-Tetley, F. E., ... & Weathers, K. C. (2020). Lakes at risk of chloride contamination. Environmental science & technology, 54(11), 6639-6650. <https://dx.doi.org/10.1021/acs.est.9b07718?ref=pdf>

Faglianio, J, Terwilliger, G., & Henson E. B. (1979). The relations of road salt to loading in Potash Brook: winter 1977-78. Department of Zoology. University of Vermont. (Available at Billings Library Special Collections GB991.V5 F33 1979)

Gao, N., Gildemeister, A. E., Krumhansl, K., & Lafferty, K. (2006). Sources of fine particulate species in ambient air over Lake Champlain Basin, VT. Journal of the Air & Waste Management Association, 56(11), 1607. <https://go.uvm.edu/gaoetal2006>

Hurley, S. E. & D. Allen (2023). Potential drinking water impacts from road salt storage facilities in Vermont’s Lake Champlain Basin. <https://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1012&context=lcsg> and <https://scholarworks.uvm.edu/lcsg/14/>

Kelting, D. L., & Laxon, C. L. (2010). Review of effects and costs of road de-icing with recommendations for winter road management in the Adirondack Park. Adirondack Watershed Institute. <https://www.adkaction.org/wp-content/uploads/2019/02/Review-of-Effects-2010.pdf>

Kelting, D. L., Laxson, C. L., & Yerger, E. C. (2012). Regional analysis of the effect of paved roads on sodium and chloride in lakes. water research, 46(8), 2749-2758. <https://doi.org/10.1016/j.watres.2012.02.032>

Kelting, D. L., & Laxson, C. L. (2021). Road Salting Induces Regional-Scale Losses of Base Cations from Forested Watersheds. Water, Air, & Soil Pollution, 232(5), 207. <https://doi.org/10.1007/s11270-021-05143-x>

Kubow, Marcos Lucianus, "Design of green stormwater infrastructure in cold climates: Material selection, phosphorus dynamics, and road salt effects" (2022). Graduate College Dissertations and Theses. 1627. <https://scholarworks.uvm.edu/graddis/1627>

Kunkle, S. H. (1972). Effects of road salt on a Vermont stream. Journal‐American Water Works Association, 64(5), 290-295. <https://www.jstor.org/stable/pdf/41266711>

Lipka, G. S., & Aulenbach, D. B. (1976). The effect of highway deicing salt on chloride budgets at Lake George, New York. <https://dspace.rpi.edu/bitstream/handle/20.500.13015/167/26590_76-02_ocr.pdf?sequence=3>

Medalie, L. (2013). Concentration, flux, and the analysis of trends of total and dissolved phosphorus, total nitrogen, and chloride in 18 tributaries to Lake Champlain, Vermont and New York, 1990-2011. US Department of the Interior, US Geological Survey. <https://pubs.usgs.gov/sir/2013/5021/>

Neher, D.A., Williams, K.M., and Lovell, S.T. (2017). Environmental indicators reflective of road design in a forested landscape. Ecosphere 8(3):e01734.<https://doi.org/10.1002/ecs2.1734>

Neher, D.A., Asmussen, D., and Lovell,  S.T. (2013). Roads in northern hardwood forests affect adjacent plant communities and soil chemistry in proportion to maintained roadside area. Science of the Total Environment. 449: 320-327. <https://doi.org/10.1016/j.scitotenv.2013.01.062>

Shambaugh, A. (2008). Environmental implications of increasing chloride levels in Lake Champlain and other basin waters. Vermont Agency of Natural Resources, Department of Environmental Conservation. <https://winooskinrcd.org/wp-content/uploads/Schambaugh2008-1.pdf>

Smeltzer, E., Shambaugh, A., & Stangel, P. (2012). Environmental change in Lake Champlain revealed by long-term monitoring. Journal of Great Lakes Research, 38, 6-18. <https://doi.org/10.1016/j.jglr.2012.01.002>

Sparacino, H. (2019). Characterizing the Management Practices and Decision-Making Processes of Winter Maintenance Companies in the Lake Champlain Basin. The University of Vermont and State Agricultural College. <https://go.uvm.edu/holdenthesis>

Sparacino, H., K.F. Stepenuck, and S.E. Hurley. (2024). Understanding Reduced Salt Practices Used by Commercial Snow Removal Businesses in the Lake Champlain Basin: A Mixed Methods Analysis. Journal of Environmental Management. <https://doi.org/10.1016/j.jenvman.2023.119957> Download for free until Feb 22, 2024 from: <https://authors.elsevier.com/a/1iMac14Z6tp4m1>

Sutherland, J. W., Norton, S. A., Short, J. W., & Navitsky, C. (2018). Modeling salinization and recovery of road salt-impacted lakes in temperate regions based on long-term monitoring of Lake George, New York (USA) and its drainage basin. Science of the Total Environment, 637, 282-294. <https://doi.org/10.1016/j.scitotenv.2018.04.341>

Swinton, M. W., Eichler, L. W., & Boylen, C. W. (2015). Road salt application differentially threatens water resources in Lake George, New York. Lake and Reservoir Management, 31(1), 20-30. <https://doi.org/10.1080/10402381.2014.983583>

Tharp, R., & Allen, D. (2020). Assessment of deicing salt storage and distribution as a salinization point source: the influence of permitting standards on water quality. Environmental Systems Research, 9, 1-15. <https://doi.org/10.1186/s40068-020-00185-2>

Vaughan, M.C.H. (2019). Concentration, load, and trend estimates for nutrients, chloride, and total suspended solids in Lake Champlain tributaries, 1990 – 2017 (Technical Report No. 86). Grand Isle, VT: Lake Champlain Basin Program. <https://lcbp-089519.s3.us-east-2.amazonaws.com/techreportPDF/86_LC_Tributary_Loading_Report.pdf>

Villamil, R. J., & Kent, F. (1980). Deicing salt migration in Vermont soils. In: Proceedings of the 1980--Seventh Annual Lake Champlain Basin Environmental Conference. p 148-161, 5 fig, 4 tab, 13 ref. (Available at UVM’s Howe Library.)

Wiltse, B. (2023). Quantifying the De-icing Salt Pollution Load to Mirror Lake and the Chubb River. <https://www.lcbp.org/wp-content/uploads/2023/10/107_Quantifying-the-De-icing-Salt-Pollution-Load-to-Mirror-Lake-and-the-Chubb-River.pdf>

Wiltse, B., Yerger, E. C., & Laxson, C. L. (2020). A reduction in spring mixing due to road salt runoff entering Mirror Lake (Lake Placid, NY). Lake and Reservoir Management, 36(2), 109-121. <https://doi.org/10.1080/10402381.2019.1675826>