Sudbury Citizens for SAFETY

A Road Salt Reduction Strategy for the City of Greater Sudbury: Challenge to be addressed – Lake Protection while Ensuring Road Users safety.

Background:

Over a multiyear monitoring period, sodium and chloride levels in Ramsey Lake have doubled and concentrations are now approaching 55 and 100 mg/L, respectively. Even prior to 1991 sodium levels exceeded, long-established World Public Health standards established to protect those with high blood pressure and at risk of heart attack.

As these concentrations increase so do our Public Health and Environmental risks, associated with Winter Maintenance activities and the use of road salt for de-icing purposes**. How to balance the beneficial use of road salt versus its' water quality impairment characteristics to both surface water and groundwater's as a now Federally defined contaminant, is a pressing concern to both the Public, Regulatory Agencies, and operating authorities charged with street, road and highway maintenance.** Unlikely most contaminants of concern, practical, energy efficient and cost-effective treatment options for NaCl do not exist and thus the only practical solution is to "use less".

Monitoring data presented in the Source Water Protection Plan for the David Street Water Treatment Plan clearly shows an increasing trend, and if those trends continue the exceedance of acute Aquatic Toxicity Effects at concentrations of approximately 125 mg/L.

Even with the adoption of best day Best Management Practices (BMPs) to the management of storm water, the treatment devices used are variable efficient and not efficient at all, if not routinely maintained. Typical removal rates for total suspended solids (i.e. sands) are 80%, for total phosphorus (TP) – 50%, and for soluble reactive phosphorous (SRP) loadings may increase post-treatment.

Simply measuring and quantify changes in water quality and flow is time consuming and expensive. However, a monitoring budget of $ 250K is well spent (and cost-effective insurance), when compared to up-grading WTP processing or out-right loss of use and the associated construction of an alternative source (at order of magnitude $ 100M).

So what does 100 mg/L of road salt really translate to? Via the use of an input – output model (and adjusted for Na mass contributions), mass loadings to the Ramsey Lake sub-watershed are in the order of 1,100 metric Tonnes per annum. This methodology and its' mass loading sets a true bench mark, and can also serve a tool to evaluate additional loading contributions from any future form of development or road construction with the Ramsey Lake sub-watershed.

In summary, we know the problem, but how to be now reduce our use of road salt?
The following Recommendations are advanced for public review, city department study and discussion.

As the largest user of road salt, implementation falls to the City of Greater Sudbury.
Secondary users (e.g. Science North, Laurentian University and Health Sciences north) and the Public-at-large at the residential level, can do better in the reduction of salt usage.

1. The City should devise and adopt "variable rate application" as standard practice based on field observations and forecast weather conditions. General guidance as to application rates are outlined in Table A-4 – Application Rates for Driveways (High Traffic – Parking Lots), University of Waterloo, 2015 report – Optimal snow and Ice Control of Parking Lots and Sidewalks. These application rates will need to be fine-tuned based on the City's in-field experience.

2. As part of the technical implementation of Recommendation 1, the City should adopt GPS tracking of their snow removal fleet, including a data management system that would record and log salt usage within the salt sensitive Ramsey Lake sub-watershed.

3. As a further extension of Recommendation 1, the City should construct and maintain a real-time, meteorological network, including the use of camera's, to track weather conditions across its' extensive service area.

4. Based on Environment Canada's most recent (2012) – Five year Review of Progress: Code of Practice for Environmental Management of Road Salts, overall use of road salt by the commercial sector accounts for less than 5 - 10% of total road salt usage across Canada. These figures at face value suggest that very little can be gained by requiring the adoption of Best Management Practices/Risk Assessment Studies by these minor contributory sources. A program of Contractor education should be adopted as a first step, and contingent upon the monitoring recommend below, the need to adopt BMP may thereafter me required.

5. The City, likely through Conservation Sudbury, should re-install and operate an enhanced hydrologic and water quality monitoring program for Ramsey Lake, similar in design to the monitoring network operated to fill data gaps identified during the development of the Source Water Protection Plan. This should include the installation of several data logging devices to monitor flows out of the Ramsey Lake, as well as all major tributary streams. A network of continuous logging conductivity probes should also be installed on key contributory sources of road salt (e.g. Frobisher Creek, the overflow from Lake Laurentian, and the St. Jean storm sewer/or the outlet of Minnow Lake). This data should be used to develop a real-time hydrologic model for the sub-catchment, and to quantify mass loadings of road salt from the lake's contributor sub-sub-watersheds.

6. The City should develop an input-output (i.e. mass balance) model for the purposes of evaluating, the associated impacts of additional loadings Na and Cl from all new development proposals in Ramsey Lake sub-watershed. This model would also serve as a tool to evaluate the water quality benefits of its' own Best Management Practices and the implementation of the same by the commercial/institutional sectors.

7. The City should consider the practicality of adopting a practice of "sanding, packing and motor-grading" many of their tertiary, rural, road ways.

Recent public meetings and subsequent media coverage can be accessed through the link below on the Greater Sudbury Watershed Alliance Website www.gswa.ca

http://gswa.ca/gswa-road-salt-discussion-5-february-2018/