Road Salt in McHenry County: Why is it a problem?

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Why do we use road salt?

Here in the Chicago Region hundreds of thousands of tons of de-icing chemicals are applied to our roads, parking lots, and sidewalks every winter to manage snow and ice. The management of snow and ice is necessary to provide safe transportation and maintain commerce during the winter months. The most common deicing chemical is road salt, mainly sodium chloride (NaCl), because it is abundant, relatively inexpensive, and effective.

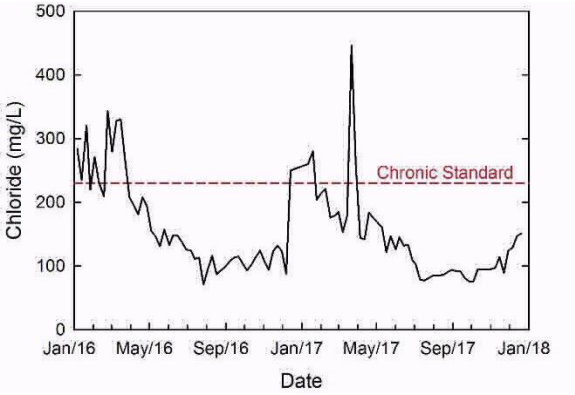
What's the problem?

The widespread use of road salt began in the 1960's and its use has increased exponentially ever since. One of the reasons that road salt is so effective at melting snow and ice is because it is extremely soluble in water. However, this solubility also makes salt a significant threat to our water resources. Once salt becomes soluble, there is no practical way to remove the chlorides from the water. As the salt dissolves and melts the snow and ice, it creates salty meltwater. The meltwater then either runs off directly into streams, lakes and wetlands or infiltrates through the soil into shallow groundwater aquifers.

It is important to remember that all drinking water in McHenry County is derived from groundwater aquifers. According to a study of McHenry County's groundwater that was conducted by the U.S. Geological Survey (USGS), chloride concentrations in groundwater increased by up to 520 percent between 1979 and 2015 and were found in wells up to 160 feet deep.

Why is it a problem?

Although chloride and sodium are not currently classified as toxic to humans, people with high blood pressure or on low-sodium diets are advised to not drink water with sodium concentrations greater than 20 milligrams per liter (mg/L). Chloride also has a secondary drinking water standard of 250 mg/L by the U.S. Environmental Protection Agency (EPA), because water starts to taste salty above these levels. Studies show that these levels are often surpassed in the Chicago Region's water, especially during winter and spring months.



Chloride concentrations in Chicago Sanitary & Ship Canal at Lockport.
Data courtesy of Metropolitan Water Reclamation District of Greater Chicago.

High salt levels can be toxic to aquatic fauna, such as fish, amphibians, and aquatic invertebrates. High salt levels can also harm plants, such as trees, shrubs, and grasses, and lead to a decrease in biodiversity. Most plant species in this region are not adapted to salt, therefore salt-tolerant plants are able to take over and replace existing plant communities. For instance, large swaths of a highly invasive, salt-tolerant species called Common Reed (*Phragmites australis*) have become common along roadways in the Chicago region, at least partially due to increasing salt levels.

Common Reed (Phragmites australis)

The chloride ion in salt is also a major corrosive agent, especially of steel reinforcement in concrete. The damage to roads and bridges due to deicing salts has been estimated to be in the hundreds of millions of dollars per year. High chloride levels can also accelerate the corrosion of metal pipes, water heaters, structures, and vehicles.

What can be done?

Public safety on our roads, parking lots and sidewalks is an absolute necessity. Unfortunately there are currently no alternative chemicals or technologies available that can replace the use of salt to manage snow and ice. Therefore, our most viable solution is to employ Best Management Practices (BMPs) that use only the minimum amount of salt needed to provide safe conditions. Since current practices for managing snow and ice generally use excessive amounts of salt, far beyond what is actually needed, there are many opportunities to reduce the amount of salt used.

The BMPs are often referred to as Sensible Salting practices and they can be very effective at maintaining public safety while reducing salt use.

Sensible Salting

Sensible Salting BMPs include a variety of options that can be used depending on site conditions, the type of equipment available, and budgets including:

Proper Storage: Protect salt from water by storing it on an impervious surface, preferably on high ground and away from stormwater inlets or drainage features. Always keep salt covered to prevent contact with rain or snow.

Calibrate Equipment: Make sure to calibrate equipment annually to accurately know how much salt is being dispersed.

Anti-Icing vs. De-Icing: Anti-icing techniques prevent the formation of ice on roadways. This is commonly done by tracking the weather and applying brine in advance of a snow event. The brine prevents an ice bond from forming, enabling plows to remove snow more effectively without repeated applications of salt.

Striping on roadway from application of liquid brine

Pre-Wetting Salt: Road salt needs to be wet in order to be effective. Pre-wetting salt allows less salt to be applied and keeps the salt on the road, while dry salt tends to bounce off.

Training and Certification: There are a number of opportunities for Sensible Salting training including workshops held by county governments and trade organizations. McHenry County has provided annual Sensible Salting workshops for the past ten years and has trained over 850 people in the use of Sensible Salting BMP's.

The McHenry County Department of Transportation (MCDOT) has long been a leader in the use and promotion of Sensible Salting practices. MCDOT actively use liquids for anti-icing and even make their own brine to reduce costs. However, these practices need to be adopted everywhere and become standard operating procedure in both the public and private sectors. Ask your municipal or township leaders about the Sensible Salting practices used in your area. Business owners should talk to their snow management contractors about implementing Sensible Salting practices on their parking lots and sidewalks. And we can all strive to reduce the use of

salt on our own properties by shoveling early and often to prevent ice from forming rather than applying salt to try and melt the snow.

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