

## *Winter, Road Salt and Low Salt Areas*

**WINTER IS STARTING** to set in, and many of us will soon be seeing sand and salt trucks on our roads working to improve our driving conditions, and reduce the risks of accidents. Beginning back in 1941, the State of New Hampshire began treating its highways with salt. Since then, the number has grown to 26 states, in which crews will apply approximately 22 million tons of road salt annually.



### Why so much salt?



We learned in grade school that salt effectively lowers the freezing point of water. So, snowy roads treated with salt will not remain frozen at 32 degrees, but will instead continue melting down to approximately zero degrees (depending on the amount of salt used). A salt treated road will clear by itself more than a road treated only with an abrasive, such as sand. The more of the road that is exposed to the sun the more the pavement will heat during the day, resulting in additional melting. So why not use more salt?

### Road Salt has Consequences

We have known for a long time that road salt is effective for de-icing roads, but we have learned that it is not without consequences. Specifically, what happens to the salt after it is applied to our roads? Road salt applied to our roads is primarily 40% Sodium Ions, 60% Chloride Ions. As the salt is dissolved in the melting snow and ice, the Sodium and Chloride ions move from the road surface into vegetation, soil, groundwater and surface water. The salt entering the environment is responsible for impacts including; water quality impacts, human health impacts, pet health impacts, wildlife impacts, vegetation impacts.

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**Water Quality Impacts:** Salt rich water is more dense than non-saline water, when it enters a surface water body it settles to the bottom. This water is less able to support life because oxygen cannot easily dissolve in the saline water. Due to the density differences, it inhibits lake turn-over or mixing, resulting in dead-zones at the bottoms of lakes and ponds. In 2008, New Hampshire listed 19 water bodies impaired by chloride; in 2010 that number increased to 40.

**Human Health Impacts:** When salt enters a drinking water well it often renders that well unusable. In New Hampshire from 1983 to 2003 the NHDOT replaced more than 424 private wells contaminated by road salt at a cost of \$3.2 million. Several public water supply wells have also been abandoned due to contamination.



**Pet Health Impacts:** According to the ASPCA's Animal Poison Control Center, ingestion of road salt by eating salt directly, licking salty paws, and by drinking snow melt and runoff "can potentially produce effects such as drooling, vomiting, diarrhea, loss of appetite, vocalizing/crying, excessive thirst, depression, weakness, low blood pressure, disorientation, decreased muscle function and in severe cases, cardiac abnormalities, seizure, coma, and even death." ([www.asPCA.org](http://www.asPCA.org))

**Wildlife Impacts:** Birds, the most sensitive wildlife species to salt, often mistake road salt crystals for seeds or grit. Consumption of very small amounts of salt can result in toxicosis and death within the bird population. Wildlife such as deer and moose are also attracted to the roadway to ingest salt crystals, which leads to higher incidents of vehicular accidents and wildlife kills.

**Vegetation Impacts:** Salt primarily causes dehydration which leads to foliage damage but also causes osmotic stress that harms root growth. Salt can disrupt nutrient uptake and cause injury to seed germination, stems, leaves, and flowering ability. Salt can lead to plant death and can also cause a colonization of salt tolerant species, such as cattails, thereby reducing species diversity.



## Enter the "Low Salt Area"



In areas sensitive to contamination by road salt, municipalities or state authorities have set up areas where "less" or in some cases, "no" salt is allowed to be applied to the road. These areas are designated by road-side signs intended to alert the salt truck drivers. These areas may contain any number of the sensitive receptors outlined above. In addition to the signs, many of these areas are listed by the agencies responsible for road maintenance. For example, MassDOT publishes a list of their "reduced salt areas" on their website.

<sup>1</sup> <http://www.usroads.com/journals/p/rmj/9712/rm971202.htm>

<sup>2</sup> <http://des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/impacts.htm>

<sup>3</sup> <http://www.massdot.state.ma.us/highway/Departments/SnowIce/WinterRoadTreatmentSnowRemoval/ReducedSaltAreas.aspx#dist5>