

ROAD SALT REDUCTION

UNDERSTANDING HOW ROAD SALT USE HAS TAKEN A TOLL ON THE ADIRONDACK PARK AND WHAT ALTERNATIVE PRACTICES OFFER A BETTER SOLUTION.

THE PROBLEM

The Adirondack park is located in the northern section of New York. Each winter the park is blanketed with, on average, 90 inches of snow. This makes the park a popular winter tourist destination for skiing, snowmobiling, and other winter sports. In order to keep up with the visitors and encourage the winter tourism economy, road salt has been heavily poured onto the winter roads to keep road ways passible. However, after years of heavy salt use, the park is suffering from problems to the environment, homeowners, and government.



Both above and underground water sources are polluted with sodium chloride and its byproducts. Homeowners obtaining water from private wells are some of the most severely impacted because government are not liable for damages caused by "regular salting practices."

Research has shown elevated salt levels are linked with problems of lake turn over, circadian rhythms, trophic cascades. Sodium chloride ions also inhibit the growth and reproduction of aquatic life, such as rainbow trout.

Bridges, roadways, pipelines, fire hydrants, road signs and other government infrastructure face severe corrosion from road salt costing municipal governments thousands in repairs and replacements each year.

Water Pollution

Public Health

Salt in drinking water is harmful towards those with preexisting health conditions, such as hypertension and heart conditions. Also, salt can cause corrosion of pipes which is linked with elevated metals, such as lead, in drinking water.

Ecosystem Failure

Why should we use less road salt?

Vehicle Corrosion

Private vehicle corrosion costs the public an estimated \$4,500 per lane mile in damages related to vehicle corrosion when road salt is heavily applied.

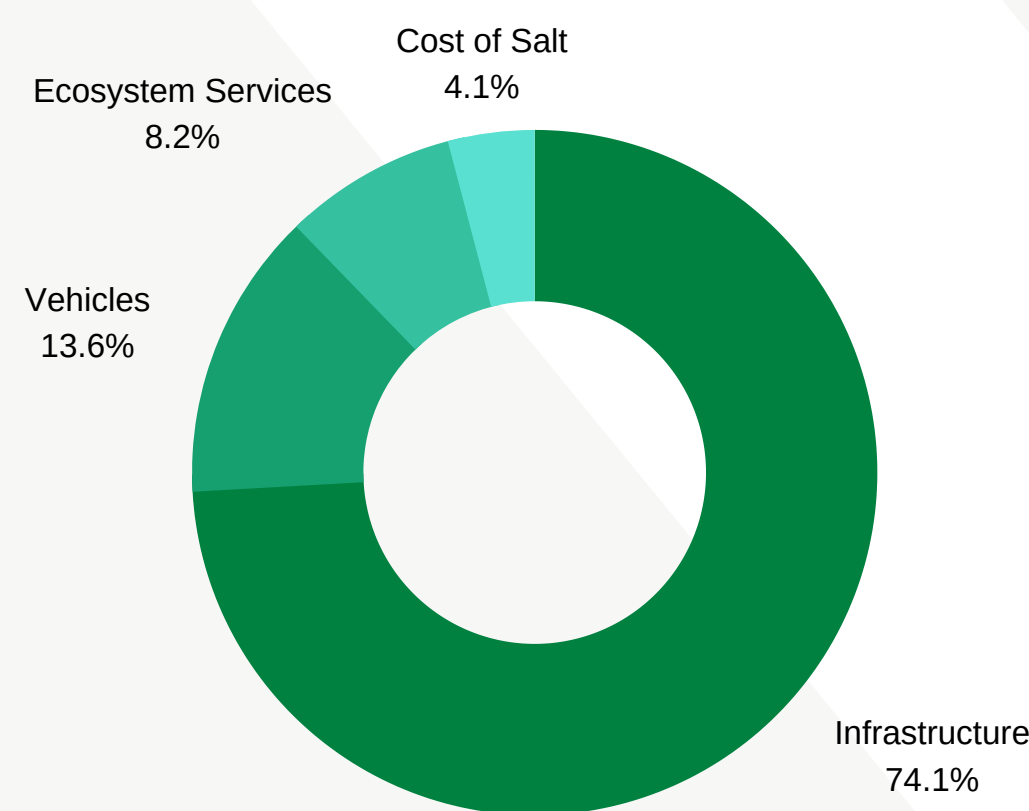
Infrastructure Damage

Increased Efficiency

When applied correctly before a storm, brine is effective at melting snow and keeping roadways safe. Brine is a mixture of road salt and water and therefore is cheaper than traditional road salt. Liquid brine sticks to roadways better than road salt, which can bounce off the road and go into the ecosystem.

Economic Analysis:

I began this summer conducting economic research to find cost estimates for the real cost of road salt on municipal governments. At the average salt distribution levels, winter road care is costing governments **\$25,000 per lane mile**. As noted on the pie chart to the right, the majority of costs come from infrastructure damages due to corrosion from road salt. There are also other private costs not listed.



"If road salt use continues in the way it does now, Joe is in for a plumbing nightmare. But when asked if he is hopeful that road salt use will decrease in the future, Joe replies, "Yeah, I'm hopeful." He continues, "There are people losing vehicles, there are people concerned about salt increasing in the lakes. It's not just homeowners with plumbing issues, it's affecting more people than that. I think it really does make a difference when they use less salt on our roads."

-Joe Thill, July 14th, 2020

Community Involvement:

A majority of my summer work was spent designing and conducting interviews to Adirondack homeowners about how road salt use has impacted them. A portion of the final project is shown to the left. These interviews are called "Salt Stories" and will be used in the AdkAction partnership working on the "Hold the Salt Campaign" website.

Several common themes showed up throughout these interviews. Of the Adirondack residents I spoke with, all of them were concerned about corrosion and had been able to see damage of some form resulting from salt. The most common visible damage is corrosion of vehicles causing rust and frequent repairs. Similarly, everyone was concerned about the freshwater in the park. Many wells have been impacted and even lakes known for being pristine and free from invasive species are seeing damage due to elevated salt and chloride levels. Even with these concerns, everyone interviewed is hopeful for positive change in the future.

Comparing Alternatives:

I spent time looking at alternatives to road salt. Commonly used alternatives include calcium chloride and sand but in the search for a better option, governments have tried using beet juice and cheese brine. While some of these alternatives were slightly better for the environment, each option still had its own, different cost. For example, calcium chloride is commonly thought of as the best alternative, but it still introduces harmful chloride ions into waterways and is significantly more expensive than rock salt. Brining before the storm with a solution of dissolved rock salt seems to be the best alternative. Brine is able to keep roads clear and it is cheaper than rock salt.

THE SOLUTION:
REDUCE ROAD SALT USE

Change winter driving behavior, slow down in bad weather

Switch to better winter road care practices such as using brine

Upgrade DOT trucks with live edge plows and GPS salt tracking

Consider the use of abrasives, such as sand, in place of salt

Stay up to date and continue to advocate for less salt



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