A Novel Approach to Minimize Road Salt Contamination in Both Terrestrial and Aquatic Ecosystems

Compton, Alyssa (School: Great Mills High School)

The initial investigation of this project was to see if the salinity levels of water runoff would decrease after the application of a salt-tolerant grass buffer zone, activated carbon, or calcium sulfate to roadside shoulders after the winter months. For this study, a controlled solution of 23% sodium chloride to water was used. The first phase of this project involved planting 24 plots of a salt-tolerant grass. Next, 24 containers were filled with crushed gravel; 8 with crushed gravel and 4g activated carbon, and 8 with crushed gravel and 4g calcium sulfate. Each container was placed in a collecting basin, and 100 mL of the controlled solution was poured over each container. Salinity levels of the collected runoff samples were then recorded. For the final phases of this experiment, the same procedure was replicated using potting soil, and the previously grown salt-tolerant grass buffer zone. After recording salinity levels, it was found that after the application of a buffer zone, activated carbon, and calcium sulfate, salinity levels in the runoff did decrease from the controlled solution. It was noted that the samples with a grass buffer zone and 4g of activated carbon had shown the largest average decrease in sodium chloride levels from the original solution. The results of this small-scale experiment signify that the application of a buffer zone, activated carbon, or calcium sulfate has the ability to significantly decrease salinity levels in groundwater runoff, and improve the terrestrial and aquatic environments.

Awards Won:

Patent and Trademark Office Society: Second Award of $500