Ice and Snow Removal: Using Salt Properly

A teaspoon of salt will permanently pollute 5 gallons of water, so proper salt use is important to protect the environment and clean water.

Using Salt: A Summary

Winter in Minnesota means slippery roads and sidewalks, and people using salt to melt the ice for safety. But when the snow and ice melt, the salt that is left behind damages plants and the rest washes into lakes and streams where it accumulates and harms wildlife. Although salt use is unregulated, it poses a real threat to water quality — the chloride in one teaspoon of road salt can pollute five gallons of water, and once it is in our water it cannot easily be removed. At high concentrations, chloride:

• harms aquatic organisms,
• alters community structure in aquatic environments, such as diversity and productivity,
• increases terrestrial bird mortality,
• becomes toxic to terrestrial plants.

Road safety is important, but there are many ways to reduce salt usage and effectively melt snow and ice.

Salt Damage

Brown spots along sidewalks and streets are not only unattractive, they are also signs that we are harming our environment. Chloride and sodium in small quantities are valuable to plants, but excess amounts create toxic conditions, leading to sights like this.

Quick Tips

• Keep up with the storm
• Manually remove as much snow as possible
• Be conservative with de-icers
• Pick the right de-icer (see the chart on the reverse side)
• Don’t use salt in the extreme cold. Wait until a sunny, warm day. You can use sand to increase traction on slippery areas.
How Salt Works
Salts are used for their ability to decrease the freezing point of water. The sodium and chloride break apart and slow the water molecules from making bonds that form ice crystals. To be effective the salt and water must be in the right concentration. Therefore, more salt does not mean more melting. Here is why it works:

Sodium Chloride \( \text{NaCl} \) dissolves in water because the Sodium \( \text{Na}^+ \) is attracted to the negatively charged \( \text{O}^- \) Oxygen. The Chloride \( \text{Cl}^- \) is attracted to positively charged Hydrogen molecules \( \text{H}^+ \). The Sodium Chloride breaks apart and is then “dissolved” by the water molecules.

<table>
<thead>
<tr>
<th>Melting Agent</th>
<th>Freezing Temps</th>
<th>Environmental attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Chloride (table or rock salt)</td>
<td>15°F</td>
<td>Cyanide and significant negative environmental effects</td>
</tr>
<tr>
<td>Calcium Magnesium Acetate (CMA)</td>
<td>22°F-25°F</td>
<td>Less toxic than Sodium Chloride</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>-20°F</td>
<td>No cyanide, lower quantities needed</td>
</tr>
<tr>
<td>Urea</td>
<td>20°F-25°F</td>
<td>Excessive nutrients, less corrosion</td>
</tr>
<tr>
<td>Sand</td>
<td>No melting effect</td>
<td>Accumulates in streams and lakes</td>
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</tbody>
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Learn More:
Minnesota Pollution Control Agency. At: http://www.pca.state.mn.us
Minnehaha Creek Watershed District. At: www.minnehahacreek.org