

Dealing with Ice and Snow

Winter brings with it lots of fun outdoor activities, like sledding, ice skating and skiing. But winter also means mounds of snow to shovel and layers of slippery ice to remove from our sidewalks and driveways.

We often attempt to make the job easier by using various products to melt the snow and ice. Salt and sand have traditionally been perceived as the cheapest and most effective materials for de-icing surfaces such as highways, walkways, and parking lots. However, many people do not realize that many of these products have hidden impacts. When the ice melts, the salt and chemicals dissolve and flow into street drains that lead directly to a lake or stream that in the Clinton River Watershed lead directly into the Clinton River and Lake St. Clair. Depending on the product used, these impacts can range from reducing oxygen levels in our lakes and streams, to “burning” or killing vegetation along sidewalks and roadsides, to damaging concrete and carpets, to increasing sediment and phosphorus levels and introducing toxic chemicals such as cyanide, chlorine or ammonia in our lakes and streams.



Help prevent stormwater pollution this winter!

Read on for tips on how to reduce salt use and prevent pollution we add to our rivers year-round.

1. Ask yourself the following questions:

- Does snow or ice need to be removed? If so, how much?
- What is the temperature of the surface I want to treat (surface temperature is lower than air temperature)?
- Will the surface be exposed to the sun, or shaded by trees or buildings (hence, warming the surface)?
- What is the temperature range when the deicing product is most effective?
- How much product is needed to be effective?

2. Shovel early and often.

When it comes to snow removal, there is no substitute for muscle and elbow grease! Deicers work best when only a thin layer of snow or ice must be melted. So head out and shovel and move as much snow as you can during the storm if possible. You can also use a hoe to scrape ice off the surface before putting down a deicer.

3. Reduce your salt use.

The most important step in deicing is to physically remove as much snow and ice as possible before applying salt. Use a shovel to break up the ice before you add another layer of salt to your sidewalk. Adding more salt without removing what has melted can result in over-application, meaning more salt and chemicals end up in the river.

You can also reduce salt use by limiting access to your home to one entrance. For every doorway that is not used, there will be less salt running into the catch basin in your street.

A little goes a long way. By limiting the amount of salt we use on sidewalks and driveways, we can reduce the amount of polluted stormwater washing into our waterways. Even if the surface you are applying salt to is relatively far from a street or stream, much of the product will not soak into the soil because the ground is frozen. It will instead become runoff as the snow melts and as rain falls in early spring. The recommended application rate for rock salt is about a handful per square yard treated (after you have scraped as much ice and snow as you can). Throwing any more salt down won't speed up the melting process. Even less salt is needed if you are using calcium chloride (about a handful for every three square yards treated – or about the area of a single bed). Use only enough deicer to break the ice/pavement bond, then remove the remaining slush by shoveling.

Finally, according to consciouschoice.com, Henry Kirchner, a Professional Engineer registered in Michigan with 18 years experience in de-icers and winter maintenance, recommends selecting pellets rather than flakes because they're much more effective at penetrating ice.

4. Avoid Fertilizers and products with Urea.

Some folks recommend the use fertilizers including those with urea (carbamide, ammonium, carbonyl diamide, etc.) because they don't contain chlorides and, since they contain nutrients (urea is a form of nitrogen) will help plant growth when the snow and ice melts. In reality, urea-based deicing products can be expensive and perform poorly below 20 degrees F. You will also need to use as much as ten times the amount of fertilizer to deice your sidewalk as you would use to fertilize your lawn. Very little of these products will actually get to your lawn or soak into the soil but will end up washing into the street and storm drain. Given that we are trying to reduce nitrogen and phosphorus in our waterways and ammonia in urea-based products can also cause serious problems in our waterways. Potassium chloride (Potash) is also a fertilizer used to combat snow and ice. Potassium chloride typically costs 3-5 times as much as sodium chloride and doesn't work as well at typical Michigan winter temperatures.

5. Limit your use of sand.

Sand doesn't melt ice. Sand simply provides traction. Sand increases the amount of sediment that is in our lakes, streams and rivers degrading or eliminating important habitat for aquatic organisms. Sediments that enter our streams through stormwater are a serious issue throughout our watershed. There is some evidence that sand products (depending on the source of the sand) can also contain significant levels of phosphorus.

6. Try an alternative!

Calcium magnesium acetate (CMA) was developed as a deicing alternative because it has fewer adverse environmental impacts than salt and doesn't cause corrosion. Although CMA is more expensive than rock salt, it is recommended for environmentally sensitive areas.

Sugar or corn carbohydrate by-products are one of the latest deicing products. Early studies indicate that these products have minimal negative environmental effects and are safe for surfaces.

However, access to these products by the general public is extremely limited in SE Michigan. If you are interested in using these products begin asking your local hardware and department stores to stock them.

There are a number of deicing products out there, especially online, that claim to be environmentally friendly. Don't assume that these products will have no impact on our waterways or aquatic life. Find out what the ingredients and what the impact of each key ingredient is before purchasing.

7. Sodium Chloride and Calcium Chloride

Both sodium chloride and calcium chloride have their advantages and disadvantages. Sodium Chloride is the least expensive deicing product but doesn't work as well as calcium chloride at lower temperatures. Calcium chloride is more expensive and the chloride can be released into the environment more easily than in rock salt. Calcium chloride can leave a slippery residue as well. The benefits of calcium chloride seem to be that it doesn't have the chemical additives that rock salt has (As much of 2 to 5% of road salt consists of other elements, such as phosphorus, nitrogen, copper and even cyanide.), is less harmful to vegetation and only 1/3 as much is needed. Calcium chloride also works very well at very low temperatures (25 degrees F) because it absorbs moisture from the air and gives off heat. Information on the impact on concrete of these and other products seems to vary depending on the source.

Other Deicing Products

Magnesium chloride is very similar to calcium chloride (effective down to about 5 degrees F) but only half of the substance deices so you need twice as much of the product.

Potassium acetate works to very, very low temperatures but costs as much as 8 times more than sodium chloride and is only available in liquid form and is known to lower oxygen levels in waterways. This product isn't currently readily available to the public.

Ethylene glycol is highly toxic to aquatic life and mammals. Propylene glycol is considered a safer alternative for mammals, however it can significantly decrease the oxygen in our waterways.

According to the USEPA Nonpoint Source News Notes-Issue 64, as glycols break down in the environment, they can release byproducts such as acetaldehyde, ethanol, acetate, and methane that are considered highly toxic to many aquatic organisms. Glycols are sometimes included in deicing products considered "pet safe".

The bottom line to dealing with ice and snow this winter in a way that protects our waterways is to shovel early and often, reduce the amount of deicer you use and be very contentious in how you apply deicing products. So get the hot cocoa brewing, pull on those snow boots and head on out to enjoy Michigan's winter wonderland! Besides, you might just meet a really nice neighbor or two in the process!