Road Salts and the Landscape

BENEFICIAL LANDSCAPES

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Nebraska winters—and their associated precipitation—can pose serious dangers to travelers. To ensure motorist and pedestrian safety, deicing salts often follow the use of plows and shovels to mitigate slickness on roads and walks. As these salts mix with melted snow and ice, they move out into the landscape, impacting built and natural environments. Here is a closer look at problems and solutions associated with salt in the landscape.

Rock salt (sodium chloride/NaCl) is the most commonly used de-icer and, while economical to apply, its corrosive nature causes an estimated $3.5-7 billion worth of damage to vehicles, roads and other infrastructure every year. Adding to the "cost" of road salt is its effect on water quality: when rain and snowmelt pick up salt, it flows from paved areas into wells, wetlands and waterways. This runoff brings consequences to ecosystems as higher concentrations of salt in the soil can favor monocultures of salt-tolerant invasive species (reed canarygrass, phragmites), displacing native plant communities and the wildlife that depend on them.

Excess salt is hard on any plant. Over time, accumulated sodium (Na) from salt destroys soil structure, raises soil pH, and kills beneficial mycorrhizal fungi—making for a harsh growing environment. Compound that with the heat, sun, wind, traffic and snow load of a typical roadside and it's a wonder anything grows. As if that wasn't tough enough, salt in soil prevents plant roots from taking up water, mimicking droughty conditions. This makes plants in saline settings—whether exposed to salt spray above the ground or salty soil below—vulnerable to stunted growth, injury and, eventually, death.

Some plants tolerate salt better than others, but this doesn't ensure they'll thrive or look very healthy, especially in streetscape situations also suffering from compaction, snow piling, etc. The best approach here might be a dual strategy that combines selecting salt-tolerant plants with minimizing salt applications wherever and whenever possible. More on best practices below.

Do you suspect that your soil has too much salt? Get it tested to find out for sure (your county extension office has more information on this service). Areas along salted streets and roads are worthy of investigation, especially where snow has been piled or where speed limits are high (salt spray from fast-moving vehicles can drift hundreds of feet). A gray and crusty appearance indicates salt accumulation; this is also associated with high water tables, low rainfall and heavy clay soils, as it means salt has not been able to leach down farther into the soil profile. Early symptoms of salt stress in plants include scorched leaf margins and needle tips. Insect or disease damage can serve as another visual cue, as salt-stressed plants are more susceptible to predation.

Considering De-icers

- Limit applications to high-risk areas (highways, intersections, inclines, steps, high-traffic walkways) and avoid application in late winter and early spring when budbreak is occurring.
- Apply a small amount early before the ice can bond to pavement (this makes it easier to plow or shovel), and/or delay application until after all the snow has been removed.
- Replace or dilute rock salt (sodium chloride/NaCl) with alternative products including abrasive materials (sand, cinders, ash, etc.), agricultural by-products (from sugar beets, corn or beer processing) and/or other de-icers (calcium chloride, magnesium chloride, potassium chloride, potassium acetate, ammonium sulfate, potassium nitrate, calcium magnesium acetate).
- Do not over-apply—always follow label instructions.

Preventing Salt Injury to Plants

- Avoid piling salted snow on plants.
- Plant on slopes and berms to allow saltwater to drain away from root zones.
- Establish barriers or windbreaks of salt-tolerant trees, shrubs and taller perennials between roads and sensitive plantings.
- Leach the soil to flush away salts that accumulate during the winter by irrigating it heavily (3-6 inches, stopping if runoff occurs) once or twice in early spring.
- Offset the effects of soil salinity by incorporating organic matter to improve soil structure, drainage and moisture retention. Use organic mulch to prevent water evaporation that would leave salt behind.

Plants with Higher Salt-tolerance

Salt-tolerant trees and shrubs include: baldcypress; birch; cherry; chokeberry; cotoneaster; currant; elm; gum; hackberry; juniper; kentucky coffeetree; larch; leadplant; lilac; locust; maple; oak; pine; poplar; serviceberry; snowberry; spruce; sumac; viburnum; willow; and yew.

Salt-tolerant forbs and grasses include: blanketflower; blazingstar; bluestem; boltonia; coneflower; coralbells; daylily; evening primrose; feather reedgrass ; globe thistle; grama; hardy hibiscus; indiangrass; iris; onion; penstemon; purple poppymallow; rabbitbrush ; rush; sage; sand lovegrass ; sedum; sweetgrass ; switchgrass; yarrow; and yucca.

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CUTLINE: The dead zone in this planting bed is the result of repeated salt application, as confirmed by its gray, cakey appearance.