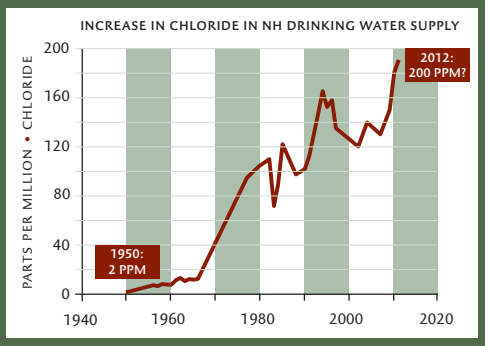
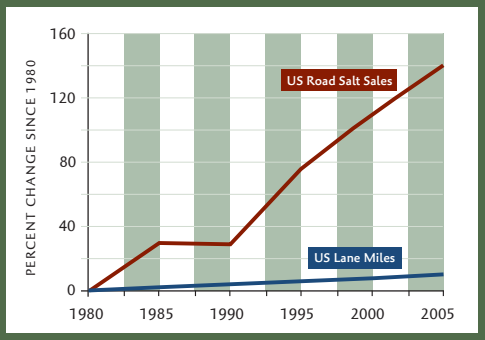
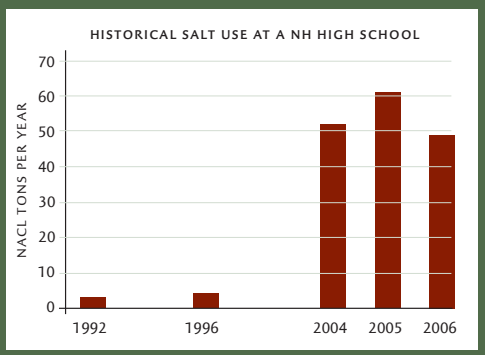
UNIVERSITY OF NEW HAMPSHIRE
STORMWATER CENTER

# Road Salt: Problems and Solutions




*US DOT Salt Institute*




*Sassan and Kahl, 2007*

## THE PROBLEM:

The use of road salt is having a significant negative impact on the environment, on human health, and on local economies.

**Each year, communities in colder regions use large amounts of road salt. Following its application, road salt percolates into the surrounding landscape, infiltrating soils and waters. This can cause a number of potentially harmful impacts.**

### Environmental

In addition to damaging trees and vegetation along roadways, excessive road salt use is linked to increased levels of chloride in surface and ground waters. Elevated chloride can inhibit plant growth, impair reproduction, and reduce the diversity of organisms in streams (USGS, 2009).

### Human Health

Road salt usage can contaminate our drinking water supplies with high levels of sodium and chloride. Traditionally, typical chloride background concentrations in New England high elevation lakes and unpolluted groundwater wells have been recorded between 1 to 10 parts per million (mg/L). Today it is not uncommon to find chloride concentrations in lakes, streams, and groundwater above the EPA drinking water limit of 250 mg/L.

### Economic

Water quality degradation in our lakes, rivers, and streams can negatively affect recreational and tourism revenue as well as decrease property values. Some New England cities even face federally-imposed development moratoria because of violations of water quality standards due to high salt concentrations in local streams. In addition, the escalating cost of road salt has had a financial impact on local and state budgets.

**Compounding these concerns is the fact that nationally, road salt usage has increased considerably in recent years. The use of salt at a local high school (left) is typical of increases in local salt application over the past two decades.**

This document was prepared by the UNH Stormwater Center, supported by USGS grant # ____ awarded by the UNH Water Resources Research Center. Authors: Steve Kahl, Dari Sassan, and Rob Roseen, 2011.

## Want to learn more?


Deacon et al, 2005. Effects of urbanization on stream quality in NH. USGS, Concord NH. **http://pubs.usgs.gov/sir/2005/5103/SIR2005-5103_report.pdf**

EPA, US. 1988. Ambient Aquatic Life. Water Quality Criteria for Chloride. Office of Research and Development, Environmental Research Laboratory, Duluth, Minnesota. EPA 440/5-88-001.

Fortin Consulting. 2006. *Winter Parking Lot and Sidewalk Maintenance Manual.* **www.pca.state.mn.us/index.php/view-document.html?gid=5491**

Kaushal, S.S., P.M. Groffman, G.E. Likens, K.T. Belt, W.P. Stack, V.R. Kelly, L.E. Band, G.T. Fisher. 2005. Increased salinization of fresh water on the northeastern United States. Proc. National Academy of Science. 102:13517-13520.

Rosfjord, C., K. Webster, J.S. Kahl, S.A. Norton, I. Fernandez, and A. Herlihy, 2007. Anthropogenically-driven changes in chloride complicate interpretation of base cation trends in lakes recovering from acidic deposition. *Environ Sci Technol,* 41:7688 -7693.

Sassan, D., and J.S. Kahl, 2007. Salt loading due to private winter maintenance practices in the NH I-93 TMDL corridor study. Final report to NH DES and NH DOT.

Trowbridge, P., J.S. Kahl, D. Sassan, D. Heath, and E. Walsh, 2010. Relating road salt TMDLs to exceedances of the water quality standard for Cl in NH streams. Environ. Sci. Technol., 44:4903-4909.

UNH Stormwater Center, a research resource for innovative methods to control stormwater and its impacts. **www.unh.edu/erg/cstev**

US DOT Salt Institute. U.S. annual salt sales. **www.saltinstitute.org**


# THE SOLUTION:

## Two common sense methods to reduce salt pollution.

### SOLUTION #1

## Reduce the application rates of salt.

Communities can use less salt and still meet public safety requirements. For example, research in Minnesota and Canada has demonstrated that salt use can be lowered by up to 50% without a reduction in public safety.

Alternative de-icers are available, but these solutions are much more expensive and also cause a host of environmental impacts. Instead, communities should recognize that salt is a contaminant of concern while focusing on reducing the need for de-icers of any kind.

Widely-available technology such as ground-speed-controlled spreaders, underbelly plows, and GPS-equipped trucks can prevent over-use of salt, as can simple measures such as sweeping snow instead of plowing.

### SOLUTION #2

## Reduce the need for salt .

If water didn't pond and freeze on roads and sidewalks, there would be no need for salt application. Therefore, the use of landscape designs and paving materials that work to infiltrate water will greatly decrease the need for salting.

Research at UNH has shown that 75% reductions in road salt are possible using porous pavements, including porous concrete and asphalt. By using these materials, water that would otherwise freeze on the surface is instead infiltrated to the soil.

*A 43-inch "rainstorm" in 3 minutes is infiltrated by pervious cement.*


This document was prepared by the UNH Stormwater Center, supported by USGS grant # ____ awarded by the UNH Water Resources Research Center. Authors: Steve Kahl, Dari Sassan, and Rob Roseen, 2011.