

# Legal and policy chloride management strategies

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Be The Difference.



# Chloride trends, nationwide



## Interdisciplinary project approach

Conduct literature review to understand extent and causes of the problem

Identify and develop potentially responsive legal and policy options

Analyze options using various metrics



## Summary of literature review

- Health and environmental impacts of elevated chloride concentrations include adverse effects on ecosystems and degraded water quality
- Elevated chloride concentrations are observed during all seasons (max. in winter months), and are highly correlated with impervious surfaces
- About half of chloride applied as road salt enters aquifers before next salting period, but chloride input continues during non-snowmelt periods due to retention in groundwater and soils
- Elevated chloride concentrations persist in watersheds for many decades (40-70 years is a reasonable estimate)



## Summary of literature review

- Relative impacts of various chloride sources are localized.

Study author	Year	Deicing and related runoff	Water softener use	Other industrial	Other or background
Madison, Wisconsin Metropolitan Sewerage District	2015	7%	57%	18%	18%
Twin Cities Metropolitan Area	Data from 2000-2007	27.5%	72.5% from wastewater treatment facilities, collectively		
State of New Hampshire	2013	96%	2%	Not reported	2%



## Responsive policy options developed

Incentivized  
self-  
governance

Information  
dissemination

Direct  
regulatory  
strategies

Chloride  
alternatives

Integrated  
watershed  
management

Direct  
economic  
measures



## Incentivized self-governance

- Example: New Hampshire program provides certification after training on best practices in exchange for snow- and ice-related liability waiver
- Advantages: forces efficiency while balancing environmental and safety concerns; cost reduction due to decreased salt usage; marketing advantages; potential insurance benefits
- Challenges: maintaining funding, voluntary nature of program, difficulty of initial passage, and potential for legal challenge
- Results: salt use decreasing by average 30%, per annual report, with corresponding cost savings; and intensive monitoring in chloride-impaired watersheds shows environmental improvements
- Hundreds of participants certified



## Information dissemination

### –Strategies for the public-at-large (SaltWise)

- Attempts to educate the public about deicer usage levels and effects on human health and the environment

### –Strategies for chloride users

- Optimize private water softener usage
- Replace older or inefficient softeners

**We can all work together to improve our salt use!**  
Click below to see what you can do

Homeowners    Municipal    Motorists    EMS    Applicators

**Important tips for homeowners!**

**Important tips for private applicators!**

Use less than **4 pounds** of salt **per 1,000 square feet.**

>>> Click for more tips <<<

**If we don't act now, our drinking water is at risk.**

The graphic features a light blue background with a row of five white icons: a person pushing a snowblower, a tractor, a SUV, an ambulance, and a person spreading salt. Below these icons are labels for 'Homeowners', 'Municipal', 'Motorists', 'EMS', and 'Applicators'. The bottom section is split into two colored areas: a green area on the left with a silhouette of a person holding a tray of salt and the text 'Important tips for homeowners!' and 'If we don't act now, our drinking water is at risk.', and a blue area on the right with the text 'Important tips for private applicators!', 'Use less than 4 pounds of salt per 1,000 square feet.', and '>>> Click for more tips <<<'. The entire graphic is set against a background of a brick building with a steeple.



## Direct regulatory strategies

- Regulations setting best practices for salt application are rare, while regulations setting best practices for salt storage are more common
- Regulation of salt trucks as point sources under Clean Water Act (legally possible but practically unlikely)
- Sewer use ordinances
- Best Management Practices could include
  - Alternative chemicals
  - Road/Weather Information Systems
  - Anti-icing/pretreatment methods
  - Uniform spreading rates, timing, and equipment

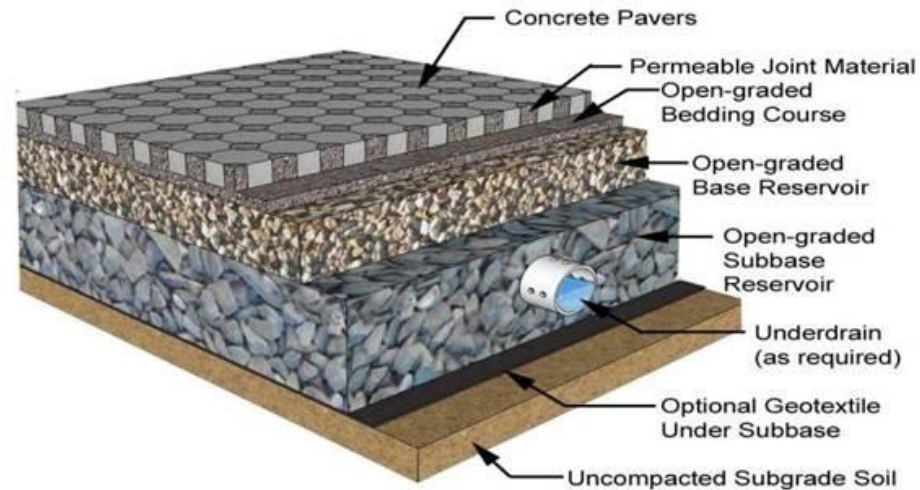
### Deicing application guidance, 24 degrees and light snow

Minnesota	80-120 lb/lane mile, depending on conditions
New Hampshire	250 lb/lane mile
Wisconsin	100-300 lb/lane mile



## Chloride alternatives

- Green infrastructure - reduces and treats storm water at its source while delivering environmental, social, and economic benefits
  - Permeable pavements, bioswales, and related technologies can reduce pollutant loads by over 90%
  - Resulting cost savings of 15-80% (reduces cost for “gray” infrastructure and road salt application)
  - NH study finds permeable pavement reduces salt application requirements by 75% because water does not pool on the surface
  - Challenges include associated costs, public resistance, and potential to transfer chloride to groundwater
- Use of alternative deicers



# Integrated watershed management

- Promotes coordinated development and management of water and related resources to maximize economic and social welfare without compromising ecosystem sustainability
- Multiple agencies/jurisdictions work together in a watershed or region to address a broad range of water issues
- Spectrum of approaches including information sharing, informal planning, and shared management
- Advantages: broad, inclusive process is flexible and allows for adaptive management. Can complement traditional approaches and provide incentives for compliance.
- Challenges: funding, inertia, legal roadblocks



## Direct economic measures

- Supply and demand; cost drives use rates
- Politically unpalatable
- Some innovative alternatives exist
- Alternative proposals (Iowa)
  - Minimal (1%) increase in state sales tax
  - Apply portion of the proceeds to water infrastructure and related water quality protection measures
  - Tie together water quality and school infrastructure
  - Iowa: would generate about \$4.7 billion for water quality improvements between 2017 and 2049
  - Alternative: fund water quality programs out of a water metering tax that currently generates about \$28 million to state's general fund annually

