
Maryland
Department of
the Environment

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# MD 2024 CHLORIDE POLLUTION REDUCTION STRATEGY

## Chloride Sources and Water Quality Impairments

One of the persistent water quality challenges facing Maryland is the continued increasing trend of the aquatic life toxicant, chloride. Maryland Department of the Environment (MDE) has documented many fresh waters impaired by chloride.

### *Chloride Sources in Maryland*

Chloride can enter a watershed from a wide variety of natural and anthropogenic sources. These sources of chloride can include the use of winter salts as deicing or anti-icing agents on roads, parking lots, and sidewalks; losses from stored winter salt; human and animal wastes; water softeners; fertilizer application; atmospheric deposition; and the dissolution of geologic formations.

There are no near-surface naturally-occurring salt deposits in Maryland. The primary source of chloride in Maryland watersheds is winter salt (see biological stressor identification studies). A water quality analysis of Cabin John Creek (MD; MDE, unpublished), a tributary to the Potomac River with a mostly urban watershed, estimated that more than 93% of chloride loading originates from de-icing and anti-icing operations.

Winter salt, primarily composed of sodium chloride, is applied to paved surfaces to prevent snow and ice from sticking to impervious surfaces, like roads, parking lots, and sidewalks. Winter salt is typically applied in either its crystalline form, as rock salt, or in its liquid form, as a salt brine. Runoff from impervious surfaces treated with winter salt tends to have very high chloride concentrations.

### *Impaired Waters*

Chloride is naturally present in most surface waters, but elevated concentrations can harm freshwater organisms. The source of the chloride to the Maryland freshwater rivers and streams known to be impaired by chloride is urban runoff/storm sewers transporting residual winter salt from impervious surfaces. Biostressor analyses indicated that chloride is a major stressor affecting biological integrity in these watersheds. Further chloride data analysis indicated that the source of the chloride is application of winter salt.

## Chloride Reduction Approach and Strategies

### *Approach*

Waters assessed as impaired by chloride are high priorities to be addressed through pollution control requirements and restoration approaches. There are no structural best management practices to remove chloride from waterways that are cost-effective and do not cause additional negative environmental impacts; therefore, Maryland is implementing adaptive management for reducing salt application. Best practices for reducing winter salt application take into account delivery, storage, handling, placement on roads, and post-storm cleanup operations. Best practices emphasize the importance of using the least amount of winter salt as possible to provide safe, passable surfaces. These practices include applicator training, pre-storm planning, spill prevention and clean-up, post-storm reviews, and evaluating and adopting new technologies.

Implementation through required winter salt reductions in stormwater permits is already underway in Maryland. Chloride pollution controls are applied statewide. Reducing winter salt application will also address human health, drinking water treatment, and other concerns. MDE has developed a story map that describes winter salt impacts.

Achieving consistent instream chloride reductions will likely take many years. Fortunately, with the increasing recognition worldwide of the negative environmental impact of winter salt driving a demand for more efficient application techniques, the introduction of new and promising technologies should enable steady, incremental reductions into the foreseeable future.

### *Strategies*

Maryland's salt reduction strategies include:

1. Requirement for Salt Management Plan and implementation in State law for State Highway Administration
2. Requirements for Salt Management Plans and implementation in the State's Municipal Separate Storm Sewer System (MS4) permits
3. Voluntary applicator training and certification
4. Public awareness through MDE's winter salt web pages and local government outreach efforts required in their Phase I MS4 permits
5. Permit requirements for other potential point sources

Additional information on Maryland's salt reduction strategies is provided below. Winter storms vary in number, timing, intensity, duration, and type of precipitation. Through adaptive management, trend analysis, and responsible plan implementation, long-term

goals can be established to lessen the usage of salt and reduce its impact while maintaining safety and mobility.

### 1. State Highway Administration (SHA)

In 2010, the Maryland State Legislature passed a law requiring the establishment of a Statewide Salt Management Plan by the Maryland Department of Transportation SHA. SHA's Salt Management Plan provides a thorough description of technical practices to minimize road salt and salt brine use, and a broad system for implementing them. The Plan describes how SHA reduces the cost of materials, along with reducing the environmental impacts of salt overutilization. The Plan also emphasizes the importance of identifying trends in salt application, an element that could potentially link management actions with environmental outcomes. Furthermore, because the Plan is updated on a regular basis, with a mechanism for assimilating new information as it becomes available, it is compatible with an adaptive management approach.

SHA's Salt Management Plan has helped reduce salt application through increased training, tracking and recording usage, and implementing new techniques such as the use of brine-only routes. Implementation of SHA's Plan has already resulted in an approximately 50% reduction in their road salt application.

### 2. MS4 Jurisdictions

Maryland's MS4 permits cover over 90% of Maryland's impervious surface area. Revised five-year permits (2021) for large Phase I MS4s included Salt Management Plan requirements. Jurisdictions are required to reduce the use of winter weather deicing and anti-icing materials, without compromising public safety, by developing County Salt Management Plans (SMP) to be submitted to MDE and implemented thereafter. Plans will include tracking and reporting, training and outreach, and evaluation of new methods and strategies. Each jurisdiction must also annually provide their winter road maintenance operator personnel and contractors with the latest training in deicer and anti-icer management.

Final determinations for Maryland's medium Phase I permits were made in December 2022. These permits contain the same requirements for salt reductions as the large Phase I permits.

Currently, Phase II MS4 permit holders are required to quantify and report pollution prevention efforts related to good housekeeping methods for snow and ice control, such as use of pretreatment, truck calibration and storage, and salt dome storage and containment.

### 3. Private Applicator Training and Certification

Maryland has developed a statewide voluntary private applicator training and certification program. Private applicators learn best practices to help improve effectiveness and efficiency, and reduce salt application while maintaining safety. A pilot program began in winter 2023. The course curriculum also includes material for people who hire winter salt applicators. By educating salt applicators and those who contract or employ them on ways to apply the minimum amount of salt required for public safety, the negative impacts of salt application on State freshwater ecosystems will be reduced.

### 4. Public Awareness

MDE maintains a winter salt website for the public, and MDE's Office of Communications periodically posts excerpts on social media. MDE is also working with the University of Maryland Extension to develop outreach products to be used for homeowners and seasonal winter maintenance workers. In addition, MS4 permits contain a requirement for jurisdictions to develop and distribute information on best salt management practices to their residents.

### 5. Permit Requirements for Other Potential Point Sources of Chloride

In permitting municipal and industrial facilities, the potential to discharge chloride, as well as instream impairment, are considered in determining requirements for monitoring and/or limits. These source loads are small compared to contributions from winter salt.