Good Practices for Road Salt Management in Salt Vulnerable Areas

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Source Water Protection Lead
Conservation Ontario

Salt Vulnerable Areas Working Group

- **Goal:** Address the winter treatment of roads in drinking water-salt vulnerable areas
- **Membership:**
  - Municipalities in Ontario
  - Conservation Authorities
  - Ministry of the Environment, Conservation and Parks
  - Environment and Climate Change Canada
- **Co-chairs:** Conservation Ontario and Ontario Good Roads Association
Salt Vulnerable Areas Working Group

Highlights 2016-2018:

- Honest discussions about municipal liability challenges and the legislation including the Clean Water Act, 2006
- Reviewed current best practices
- Prioritized specific salt vulnerable areas
- Had the document reviewed by legal staff of York Region.

Outcome: Good practices document, released July 2018, that:

- Supports municipalities of varying budgets and capacities with practices that address road salt management

Good Practices for Winter Maintenance in Salt Vulnerable Areas

Content:

1. The Legal Context
2. Finding the Balance
3. Good Practices
4. References
5. Appendices
   - Minimum Maintenance Standards, Level of Service
   - Maps of Salt Vulnerable Areas (Issue Contributing Areas – sodium and chloride issues)
Good Practices Salt Vulnerable Areas

Legal Context and Other Frameworks

- **Municipal Act (2001)**
  - Maintenance of highways/bridges: “state of repair”.. “reasonable in the circumstances”
  - Liability: *Negligence Act*
  - Council approved Level of Service

- **Code of Practice - Road Salt (2004)**
  - Voluntary adoption of the code
  - Annual road salt usage reporting
  - Salt Management Plans
  - ECCC Salt Vulnerable Areas Identification - draft

- **Clean Water Act (2006)**
  - Drinking Water Vulnerable Areas
  - Source protection plan policies - road salt management
  - Risk Management Plans
  - Municipal Salt Management Plan Updates


- The Ontario *Clean Water Act* was passed in 2007 for drinking water source protection.

- Mandatory for municipal residential drinking water systems within source protection areas.

- Municipalities may also include other systems (private, non-residential).

- **First Nations** may include their systems through band council resolution leading to regulation.

Multi-barrier approach: Protecting from Source to Tap

**Vulnerable areas:** Well, Intake, Issue Contributing, Event Based, other

**Threat activities:** e.g.: septic systems, fuel storage, road salt storage and use, gas stations, chemicals storage and use, commercial fertilizers, manure, livestock grazing, etc.

**Policy tools:** municipal land use planning, risk management plans, salt management plan updates, nutrient management plans, septic site inspection, etc.

https://www.ontario.ca/page/source-protection

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**Issue Contributing Areas**

- Water quality “issue”: known contaminant that can impair the **source of drinking water**, e.g.: nitrate, chloride.
- Activities contributing to an “issue” occur in **Issue Contributing Areas**.
- **Issue Contributing Areas** are delineated in vulnerable areas, or “drinking water protection zones”.
- The contributing activities are subject to mandatory source protection policies.
**Issue Contributing Areas**

- **Issue**: known contaminant that can impair the source of drinking water, e.g.: sodium, chloride
- **Activities** contributing to an Issue are subject to mandatory policies

Activities: road salt storage, road salt application, snow storage

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**A Salt Reduced Diet...Good Practices**

<table>
<thead>
<tr>
<th>No.</th>
<th>Good Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weather monitoring: Road Weather Information System, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Equipment: maintenance, calibration, automation, upgrades</td>
</tr>
<tr>
<td>3</td>
<td>Personnel: staff training, winter maintenance specialist</td>
</tr>
<tr>
<td>4</td>
<td>De- and Anti-icing Materials: types, effective temperatures, comparisons</td>
</tr>
<tr>
<td>5</td>
<td>Application methods and rates</td>
</tr>
<tr>
<td>6</td>
<td>Snow and ice control methods: new municipal standards for sidewalks; snow storage and disposal; snow fences</td>
</tr>
</tbody>
</table>

Includes: Practices from Transportation Association of Canada, various municipalities
Good Practices Salt Vulnerable Areas 6

A Salt Reduced Diet…Good Practices

Table 2: Lowest Effective Working Temperatures of Common De-icing Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Lowest Effective Working Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Chloride</td>
<td>-7</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>-23</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>-29</td>
</tr>
</tbody>
</table>

*Note: The materials may work below the specified lowest effective working temperatures, but the effectiveness decreases; the materials will not work well within a reasonable timeframe.*


A Salt Reduced Diet…Good Practices

Anti-Icing With "Enhanced Brine"
- Salt brine with added magnesium chloride (MgCl₂), or calcium chloride (CaCl₂), etc. - NOT for sodium chloride brine alone
- Ground speed: 40 km/hr

Table 6: Enhanced Brine Application Rates

<table>
<thead>
<tr>
<th>Application</th>
<th>Light Traffic /Low Volume</th>
<th>Heavy Traffic / High Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frost &amp; black ice prevention</td>
<td>20 to 40 litres/lane km</td>
<td>30 to 50 litres/lane km</td>
</tr>
<tr>
<td>Anti-icing</td>
<td>60 to 90 litres/lane km</td>
<td>80 to 110 litres/lane km</td>
</tr>
<tr>
<td>De-icing</td>
<td>120 to 140 litres/lane km</td>
<td>140 to 160 litres/lane km</td>
</tr>
</tbody>
</table>

Anti-Icing Using Salt Brine Only
- Ground speed: 40 km/hr

Table 7: Salt Brine (Only) Application Rates

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<td>30 to 50 litres/lane km</td>
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<tr>
<td>Anti-icing</td>
<td>80 to 110 litres/lane km</td>
<td>100 to 130 litres/lane km</td>
</tr>
<tr>
<td>De-icing</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
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<td>7</td>
<td>Water quality monitoring: provincial/local programs, importance, test wells</td>
</tr>
<tr>
<td>8</td>
<td>Parking lots: better management needed! Site plan, training, rates</td>
</tr>
<tr>
<td>9</td>
<td>Salt storage: keep it dry, covered, contained; prevent spills</td>
</tr>
<tr>
<td>10</td>
<td>Salt management plan review: review and adjust annually; use of Winter Web App</td>
</tr>
<tr>
<td>11</td>
<td>Risk management plans (under the <em>Clean Water Act, 2006</em>)</td>
</tr>
<tr>
<td>12</td>
<td>Additional: reduce speed limits in Issue Contributing Area, road signs</td>
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### Communicating About Salt

![Image of a poster with text about conserving water and reducing salt use.]

**Conservation Ontario**

*Yes, we know it’s a winter wonderland, but it’s good to be prepared.*

Just released!! Good Practices for Winter Maintenance in Salt Vulnerable Areas provides a variety of practices to help protect Ontario’s sources of municipal drinking water. More info at: [Conservation Ontario](http://www.conserveon.ca)

**Help Protect and Conserve our Water**

*Apply winter salt only as needed.*

**Aide à protéger et à conserver notre eau**

*Réduisons l’épandage de sel abrasif*
Good Practices Salt Vulnerable Areas

The Road Ahead

• The good practices document is a “living” document, to be reviewed every two years.

• Recommendations to third party contractors regarding parking lots, to evolve.

• Continue discussions with the federal government on their project for road organizations on identifying, categorizing and planning for salt vulnerable areas.

• Continue spreading the good news about the good practices!
Thank you.

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