Winter Maintenance Assessment tool (WMAt)
Twin Cities Metro Area Chloride Management Plan

Did you know that 1 teaspoon of road salt pollutes about 5 gallons of water (forever)?

www.pca.state.mn.us/programs/roadsalt.html
Chronic Water Quality Criteria (230 mg/L)

Northern Sites

Southern Sites

- Nov-Apr
- May-Oct

# of Sites: 12 6 21 6 29 15 7 7 11 12 17 14 5 19 22 6 3 162 50

Streams
Protection and Restoration Strategy

Chloride is a permanent pollutant
It does not bio-degrade or go away, it accumulates in our water

• Prevention is the **ONLY** option for reducing salt
• Goal is for all winter maintenance programs to perform at a level that is using minimal amount of salt
What I learned from working with maintenance professionals

You can’t tell them what to do
They want to chart their own path
A team of winter maintenance pros guided the development of WMAt
Conduct a free assessment of your operations

Google “WMAt MPCA”
Provide information for your new assessment:

Assessment Name: Townsville Roads BMP
Assessment Description: Johns version

Assessment Type(s):
- Best management practices (BMPs)
- Salt savings calculations

Time Period(s) to Assess:
- Past winter season: 2009-10
- Current winter season: 2014-15
- Future winter season: 2019-20

Surface Type(s) to Evaluate:
- High Speed Roads (≥ 45 mph)
- Low Speed Roads (< 45 mph)
- Parking Lots
- Sidewalks / trails

Create Assessment
### WMAat Assessment: main street (2014-15)

#### Accuracy: Calibrate

**Q1. How often do you calibrate spreaders?**

<table>
<thead>
<tr>
<th>Practice</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Future (2014-15)</td>
<td>All equipment yearly</td>
</tr>
<tr>
<td>Practice (2019-20)</td>
<td>All equipment yearly, plus if equipment changes or something looks wrong</td>
</tr>
<tr>
<td>Response</td>
<td>Most equipment yearly</td>
</tr>
<tr>
<td>Most equipment every other year</td>
<td></td>
</tr>
<tr>
<td>New equipment only</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
</tr>
</tbody>
</table>
You can give us your suggestions...

WMAAt Assessment: main street (2014-15)

Table of Contents
- Complete
  - Application Rates (100% complete)
  - Controllers (100% complete)
  - Accounting (100% complete)
- Before the Storm: Anti-Icing (100% complete)
  - Anti-Icing (100% complete)
  - Plow & Apply (100% complete)
  - Call Outs (100% complete)
- Efficiency:
  - Deicers (100% complete)
  - Anti-Icing (100% complete)

Before the Storm: Anti-Icing

Q34. Where do you anti-ice?

<table>
<thead>
<tr>
<th>Current Future (2014-15)</th>
<th>Practice</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All areas where we salt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some of the areas where we salt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None of the areas where we salt</td>
</tr>
</tbody>
</table>

View Comments | Submit a Comment
Comparison of Responses Between Assessment Periods

Assessment Name: 
Location:  
Winter Period: 2014-15  
Surface Type(s): Low Speed Roads

<table>
<thead>
<tr>
<th>Period</th>
<th>Advanced</th>
<th>Best</th>
<th>Poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past (2007-08)</td>
<td>24</td>
<td>26</td>
<td>70</td>
<td>120</td>
</tr>
<tr>
<td>Current (2014-15)</td>
<td>58</td>
<td>47</td>
<td>26</td>
<td>121</td>
</tr>
<tr>
<td>Future (2019-20)</td>
<td>104</td>
<td>22</td>
<td>5</td>
<td>131</td>
</tr>
</tbody>
</table>

Legend: 
- Advanced
- Best
- Poor
Past Winter Maintenance Practices
City 2 Winter of 2008-2009
For maintenance of: Low Speed Roads

Summary:
- **46 Poor Practices**
- **18 Best Practices**
- **61 Advanced Best Practices**

**Entry # 114**
Joe Smith
8-18-2013
763-444-5555
joe@roundville.gov

**NOTES:** We do both streets and parks.

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**ADVANCED BEST PRACTICES**

23. Who determines application rates? *We make our own application rate chart. The rates are comparable to the MN field handbook for snowplow operators or the MN parking lot and sidewalk manual*

36. How do you treat frost? *Anti-ice to prevent frost*

42. Roads: what do you do with a 2 inch snow? *Remove it, salt only if necessary*

47. How do you plow and apply salt? *Plow 2 lanes then apply salt to middle*

49. How do you manage routes that overlap? *Avoid plowing or salting on other peoples routes unless requested*

52. How effective are you are removing slush before salting? *High*

55. How effective are you at removing a 2 inch snow fall before salting? *High*

56. How effective are you at removing wet heavy snow before salting? *High*

57. Do you have good equipment for effective removal? *Yes*

60. Is your response to snow events the same during weekday hours and weekend/evening
BEST PRACTICES

11. Do your operators know how to read your application rate charts? No, supervisors read charts and assign rates
38. Do you have any automated anti-icing systems built into your pavement surfaces? No
41. Roads: what do you do with a light snow? No plow, salt if needed
50. When we have compaction, our “primary tool” is to? Scrape it, then salt
53. How effective are you at removing compacted snow and ice before salting? Medium
58. Once snow removal is started, when does it stop? Snow removal during shifts, breaks without snow removal
70. When pavement temperatures are below 15 degrees, how often do you use granular salt? Some of the time
75. Do you prevent moisture from entering salt sheds? OK quality buildings or a mix of good and bad buildings
82. Do you receive salt shipments indoors or outdoors? Receive shipments outdoors, move them indoors with good clean up
99. How often do you wash your trucks? After the storm
105. Where do you place the salt? Spread pattern in center
115. Do you primarily use a vbox or dump truck? Dump truck
116. How do your trucks dispense salt? Auger
127. How long after the storm until you apply salt? Apply deicer immediately if we have a deicer that works for the pavement temperature
156. How well do operators work together within your organization? Ok
166. How fast do you need melted surfaces? Faster than in the past, use same amount of salt
172. How do you dispose of truck wash water? Dispose of wash water in sanitary sewer (goes to treatment plant)
173. Where does your storage runoff water go? Collect runoff, bring to sanitary sewer
POOR PRACTICES

1. How often do you calibrate spreaders? *Never*
2. How many anti-icing systems (liquid only spreaders) do you calibrate? *Don’t have any*
3. How many liquid prewet systems do you calibrate? *Don’t have any*
4. How many granular salting trucks do you calibrate? *None*
5. Which is your primary type of spreader controls (active fleet only)? *Manual*
6. What % of your fleet is set up for liquids (of the trucks that apply salt)? *0-49%*
7. Where are your manual spreader control calibration charts? *Not with the equipment*
8. for manual spreader controls: do your operators know how to read calibration card? *No*
9. What materials do you calibrate for? *Don’t calibrate*
10. Are your application rates based on pavement temperatures? *No*
11. Do most of your operators follow application rate recommendations? *No*
13. Manual controllers: when salting at different speeds how often does your crew change spreader settings? *Rarely*
14. How accurate are our salt use numbers? *Low – estimate at end of year*
15. Where do you anti-ice? *None of the areas we salt*
16. When do you anti-ice? *Never*
17. What do you do with slush? *Ignore it*
18. Do we have the ability to do as much physical removal as needed to avoid over applying salt? *No*
19. What method do you primarily use for deicing (not anti-icing)? *Dry salt*
20. Are you using liquids for deicing? *No*
21. We understand the practical pavement temperature range of our deicers? *No*
22. We select appropriate material for pavement temperature? *Don't adjust our product selection based on pavement temperatures*
23. Are your trucks tarped during application? *No*
24. Where is the loading area for trucks? *Outdoors*
25. Which tools/equipment do you use to unload? *None*
26. How often is the outdoor loading area swept back into the pile? *Rarely*
27. What is the lowest application rate, most of your trucks can deliver with an even spread pattern? *More than 200 lbs per lane mile (or 500 lbs per acre)*
28. Are supervisors comparison crew actions to salt application guidelines? *No*
29. Does the crew document their actions? *No*
30. Do you use snow fences? *No*
31. How often are crew and supervisors trained on conservative salt use? *Crew is trained occasionally*
32. Does crew and supervisors understand the long term impacts of salt on our waters? *No*
33. How do you rate your operators' willingness to change? *Low*
34. Do you educate your customers about salt, the environment and what you are doing to be proactive? *No*
35. Are trouble areas documented on each route? *No*
36. Do you encourage lower speed, safer customer behavior during winter? *No*
Welcome to Salt Savings Mode

• Input data from last winter
  – Salt used, brine used, lane miles, # trucks...
• Predict your changes in practices
  – Start anti-icing...
• Assuming you have the same winter weather as last year
• Output your projected salt savings
How accurate is salt savings mode?

- Not very
- We only have equations for 10% of the practices
- Need more research on salt savings potential for each type of practice

We have a place for that data, help us find it!
Provide information for your new assessment:

Assessment Name: Townsville Roads Salt Savings

Assessment Description: Road dept. SS

Assessment Type(s):
- Salt savings calculations

Time Period(s) to Assess:
- 'Past' winter season: 2009-10
- 'Current' winter season: 2014-15
- 'Future' winter season: 2019-20

Surface Type(s) to Evaluate:
- High Speed Roads (>= 45 mph)
- Low Speed Roads (< 45 mph)

Create Assessment
The questions are fewer but harder to answer

Q4.8.d. How many V-boxes and dump trucks do you have in your fleet?

<table>
<thead>
<tr>
<th>Practice</th>
<th>How many in your fleet?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>(current) (future)</td>
</tr>
<tr>
<td>V-box</td>
<td>15 15</td>
</tr>
<tr>
<td>Dump truck</td>
<td>25 25</td>
</tr>
</tbody>
</table>

View Comments (0) Submit a Comment/Tip
Comments show how savings were determined

Q4.1.a. What is the most common way you store your bulk salt in the winter?

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments for WMAt Question 4.1.a**

5% loss from tarped to indoors

*Source: Barry Underdahl, City of Inver Grove Heights*

says tarp is ok if done right.

*Source: Bob Vasek, MnDOT, 12/12/12*
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>19,900 tons of salt stored</td>
<td>16,430 tons of salt needed (total: granular + liquid)</td>
</tr>
<tr>
<td>500 tons of salt/sand mix stored</td>
<td>15,970 tons of salt needed (granular)</td>
</tr>
<tr>
<td>10% salt in salt/sand mix</td>
<td>400,000 gallons of liquid needed</td>
</tr>
<tr>
<td>19,680 tons of salt used</td>
<td>0 gallons for pre-wetting</td>
</tr>
<tr>
<td>430 tons of salt/sand mix used</td>
<td>400,000 gallons for anti-icing</td>
</tr>
<tr>
<td>200,000 gallons of liquid used</td>
<td>10% salt in salt/sand mix</td>
</tr>
<tr>
<td>0 gallons used for pre-wetting</td>
<td>FUTURE MATERIAL NEEDS</td>
</tr>
<tr>
<td>200,000 gallons used for anti-icing</td>
<td></td>
</tr>
<tr>
<td>$70.00 per ton of salt</td>
<td></td>
</tr>
<tr>
<td>$0.10 per gallon of liquid</td>
<td></td>
</tr>
<tr>
<td>60% salt used on high-speed roads</td>
<td></td>
</tr>
<tr>
<td>40% salt used on low-speed roads</td>
<td></td>
</tr>
<tr>
<td>0% salt used on parking lots</td>
<td></td>
</tr>
<tr>
<td>0% salt used on sidewalks and trails</td>
<td></td>
</tr>
<tr>
<td>40% sand/salt mix used on high-speed roads</td>
<td>ESTIMATED SAVINGS</td>
</tr>
<tr>
<td>60% sand/salt mix used on low-speed roads</td>
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<tr>
<td>0% sand/salt mix used on parking lots</td>
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<td>0% sand/salt mix used on sidewalks and trails</td>
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</tr>
<tr>
<td>80% liquid used on high-speed roads</td>
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</tr>
<tr>
<td>20% liquid used on low-speed roads</td>
<td></td>
</tr>
<tr>
<td>0% liquid used on parking lots</td>
<td></td>
</tr>
<tr>
<td>0% liquid used on sidewalks and trails</td>
<td></td>
</tr>
<tr>
<td>3,753 tons of salt likely to be saved (granular sources only)</td>
<td>17.7% reduction potential</td>
</tr>
<tr>
<td>-200,000 gallons of liquid likely to be saved</td>
<td></td>
</tr>
<tr>
<td>3,523 tons of salt likely to be saved (from both liquid and granular sources)</td>
<td></td>
</tr>
<tr>
<td>Predicted Cost Savings:</td>
<td></td>
</tr>
<tr>
<td>Salt Savings: $262,731.00</td>
<td>Salt Savings: $262,731.00</td>
</tr>
<tr>
<td>Liquid Savings: -$20,000.00</td>
<td>Liquid Savings: -$20,000.00</td>
</tr>
<tr>
<td>Net Savings: $242,731.00</td>
<td>Net Savings: $242,731.00</td>
</tr>
</tbody>
</table>

The left side reflects current material use. The right side predicts future material needs and cost savings based on estimated savings.
Ideas for using WMAt Reports
Show off your good work!
Nominate yourself for an award!

- Press release to the news paper or TV
- Tweet it or other social media
- Post it on your website

see the section of **2013 Permit Reissuance: Filling out the SWPPP document**, however the tool is not a part of that at this point. So the reports can be used as supporting documentation for fulfilling the reporting requirements.
Operator Training
Supervisor Training

- Everyone on the same page?
Developing your organization

Can the tool give you a glimpse into how they view the future of the organization?
If the current usage is 19,680 tons: You can predict a yearly savings of 704 tons or $49,970.

If the shed is budgeted for $150,000 it can be payed off in 3 years time.

In 5 years time you will have saved the organization $100,000!
Track progress
5 year plan

- Year 1 and 2 we will do change of practices that do not involve purchases
- Year 3 $20,000 towards purchases of tarps for trucks
- Year 4 $250,000 for a new storage shed
- Year 5 $200,000 toward anti-icing equipment
Get your organization certified

Certification instructions are on the website & level II training classes are available to help you.

<table>
<thead>
<tr>
<th>No</th>
<th>Application Date</th>
<th>Expiration Date</th>
<th>Type</th>
<th>MS4</th>
<th>Organization/ Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2/16/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>Yes</td>
<td>Roseville, Public Works</td>
</tr>
<tr>
<td>2</td>
<td>2/19/2016</td>
<td>9/1/2019</td>
<td>State</td>
<td>YES</td>
<td>MNDOT, Eden Prairie Truck Station</td>
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<tr>
<td>3</td>
<td>3/2/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>Yes</td>
<td>Edina, Public Works</td>
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<tr>
<td>4</td>
<td>3/15/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>Yes</td>
<td>Crystal, Public Works</td>
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<tr>
<td>5</td>
<td>4/7/2016</td>
<td>9/1/2019</td>
<td>Private</td>
<td></td>
<td>Prescription Landscaping, St Paul</td>
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<tr>
<td>6</td>
<td>4/18/2016</td>
<td>9/1/2019</td>
<td>County</td>
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<td>Carver County, Public Works</td>
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<tr>
<td>7</td>
<td>4/18/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>Yes</td>
<td>Eden Prairie, Public Works</td>
</tr>
<tr>
<td>8</td>
<td>4/22/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>YES</td>
<td>Rochester – Public Works</td>
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<tr>
<td>9</td>
<td>6/30/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>YES</td>
<td>White Bear Lake - Public Works</td>
</tr>
<tr>
<td>10</td>
<td>7/1/2016</td>
<td>9/1/2019</td>
<td>City</td>
<td>YES</td>
<td>Maple Grove - Streets Dept</td>
</tr>
</tbody>
</table>

Voluntary Environmental Certification Level 2
Smart Salting Snow and Ice Control Best Practices

This is to certify the following organization

City of Townsville

has voluntarily completed and submitted the winter maintenance assessment to minimize salt impacts in Minnesota.

Andrew Rezvani, MPCA
Resource Management and Assistance Division
Issue Date: April 23, 2016

Your knowledge and actions will help protect Minnesota lakes, streams and groundwater.

Certificate Expires 2 years after Issue Date

Minnesota Pollution Control Agency
Getting attention

• **Environment Canada**
  - Expressed interest in creating a metric version

• **New Hampshire**
  - Seeking EPA funds to make a New England Version

I hope we can all work together to improve the usability and accuracy of this tool, and provide the industry the best tool possible to protect our water.
Questions

Google “WMAt MPCA”