Minnesota's Groundwater and Chlorides

Minnesota Water Resources Conference St. Paul, Minnesota

October 15, 2014

Sharon Kroening Research Scientist



Minnesota Pollution Control Agency



wq-iw11-06dd

What is Chloride?





Road Salt– Big Source







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Chloride is Toxic to Aquatic Life







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Too Much Salt Makes Water Undrinkable





Minnesota's Groundwater Resources





Groundwater

How the water table looks in a cross section of land





Groundwater Is In Many Different Kinds of Rocks





Groundwater Is In the Sands Beneath Us!







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Surficial Sand and Gravel Aquifers





Sandstone and Limestone Rock Aquifers





Many Aquifers in Southeastern Minnesota

Time [Age]			Time-Rock Units		Rock Units			Approx. Max
ra	Period	Epoch	System	Series		Formation	Lithology	Feet, Meters
PALEOZOIC	DEVONIAN	MIDDLE		CE	DAR VALLEY		305/93	
	No.	E	and the second	CHAMPLAINIAN	MAQUOKETA			70/21
	ORDOVICIAN	LA.			DUBUQUE			35/11
					GALENA			230/70
		MIDDLE	ORDOVICIAN		DECORAH			95/29
					PLATTEVILLE		1, L,	35/11
					GLENWOOD		the second secon	18/5
					S	ST. PETER ANDSTONE		155/47
		RLY		CANADIAN	RE du GROUP	SHAKOPEE		240/73
		EA			PRAIF	ONEOTA DOLOMITE		170/52
	CAMBRIAN		CAMBRIAN	ST. CROIXAN	s	JORDAN ANDSTONE		115/35
		LATE			ST. LAWRENCE			65/20
					FRANCONIA			190/58
					IBONTON SS		and the second	45/18
					GALESVILLE			95/29
					SANDSTONE		and the second sec	
					EAU CLAIRE			195/60
					- 9	MT. SIMON SANDSTONE		315/96
				AND ROOM PRO	HINCKLEY		procession and the second	
RE	CAMB	RIAN	LOWER,	LOWER, MIDDLE		ND du LAC		Sel Contractor
ERA			AND UPPER PRECAMBRIAN		IGNE	OUS and META- PHIC Basement Rocks		



MPCA's Ambient Groundwater Monitoring Network





Early Warning Network









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Domestic Wells







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Chlorides in Minnesota's Groundwater





Chloride Concentrations in Minnesota's Sand and Gravel Aquifers





Chloride **Concentrations** in **Minnesota's** Bedrock Aquifers 2007-2011











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Chloride Sources in Minnesota's Sand and **Gravel Aquifers** 2007-2011





Chloride Concentration **Trends** in **Minnesota's** Groundwater 1987-2011





Well #243267

Concentrations Increased by 100 mg/L in Some Wells



Well #560423





Summary

- The shallow groundwater in the TCMA is impacted by high chloride concentrations.
- Almost 30 percent of the wells in the TCMA contained concentrations that exceeded the drinking water guidance.
- Concentrations were greatest in GW underlying urban land.
- Almost one-third of the wells showed increased concentrations over time.



Thank You!

Brooke Asleson Minnesota Pollution Control Agency

WATER RESOURCES CONFERENCE OCTOBER 15, 2014

CHLORIDE RR



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Chloride & Water Quality

Water Quality Concerns

- Chloride is toxic to aquatic life
 - o 230mg/L Chronic, 860 mg/L Acute
- Chloride is a permanent pollutant, once in our waters there is no feasible way to remove it
- Road Salt and water softening salt are the main sources of Chloride in Twin Cities Metropolitan Area (TCMA)
- University of Minnesota study found that 78% of the chloride used is being retained in the TCMA





Water Quality Conditions

- 38 lakes, streams & wetlands on DRAFT 303(d) list for chloride in the TCMA (roughly 10% assessed)
- 40 waters determined to be "High Risk"
 - Defined as having values within 10% of the standard or at least one exceedance of the standard
- Groundwater levels of chloride in the TCMA are increasing
 30% of wells above the standard
 - Impact on baseflow levels of chloride is important
- USGS groundwater data also shows Significant increase in chloride since 1996 in Upper Mississippi River Basin

Public Safety Concerns: Road Salt

- 365,000* tons of road salt are
 - applied in TCMA each year *this is an estimate based on purchasing records



- We need safe roads, parking lots and sidewalks in winter months
- Currently no alternative de-icer without negative impacts to the environment
- Applied at all levels; State, County, City, Businesses/Schools/Churches and Homeowners
- Private applicators up against fear of slip & fall lawsuits default is to apply more product
- Public expectations are difficult to meet

Public Concerns: Water Softening

- The public desires soft water (minimal hardness levels)
- Individual water softeners are used in many households without much thought given to amount of salt used
- Treatment to remove chloride from wastewater effluent is costly



TCMA Chloride Project

TCMA Chloride Management Plan

- Develop Chloride Management Plan for the 7-county metro (*project began 2010, draft plan Oct. 2014*):
 - Create shared vision & develop partnerships
 - Evaluate existing water quality conditions
 - Identify sources of chloride in TCMA
 - Set realistic goals to protect all surface waters
 - Complete Chloride TMDLs for all impaired waters
 - Layout flexible implementation strategies that will help achieve water quality goals
 - Provide resources to assist with implementation and tracking progress

Inter-Agency Advisory Team

MPCA, MnDOT, Met Council, BWSR, DNR, USGS, Dept. of Health, U of M

Monitoring Sub-Group

MPCA, DNR, Met Council, USGS, local partners

Implementation Plan Committee

Winter Maintenance Professionals, Cities, Counties, MnDOT, WMOs/WDs MPCA project team

Technical Advisory Committee

WMOs, WDs, Cities, Counties, MnDOT

Technical Expert Group

Hands-on road salt applicators and suppliers

Outreach Group

WMOs, WDs, MS4s, road salt applicators, Citizens Education & Outreach Committee MPCA, MnDOT &

local education specialists

Outreach & General Communications

- MPCA Road Salt & Water Quality Website
- October 2011 Poster at WRC
- August 2012 Salt Dilemma Display created
- Jan. 2013 EPA's Stormwater Pollution Prevention Webinar Series: Road Salt Pollution Prevention Strategies
- Numerous press releases and media interviews since 2010
- Road Salt Symposium annually since 2010





Project Monitoring

- Fall 2010 Spring of 2013
- Included 74 Lakes, 27 Streams, 8 Stormsewers
- Targeted monitoring based on:



- Osgood index, available local partners, existing data near standard
- Sampled once each season (4 events/year)
- Lakes included surface & deep lake sample
- Involved several local partners:
 - Capitol Region WD, City of Prior Lake, DNR, Met Council, Minnehaha Creek WD, Minneapolis Parks and Recreation Board, MPCA, Mississippi WMO, Ramsey County Environmental Services, Ramsey-Washington Metro WD, Rice Creek WD, Three Rivers Park District, USGS


TCMA Chloride Management Plan

Goal of the CMP Inform an understanding of the impacts of chloride on TCMA water quality • Develop an appreciation of the competing demands of level of service and reduced salt usage Set performance-based goals for restoration and protection Purpose Inform and guide implementation of improved winter maintenance practices and policy needs Demonstrate the success and economic benefits of improved practices Status and trends of chloride levels in lakes, streams and groundwater Sources of chloride Scope Restoration and protection goals Implementation strategies to reduce chloride impacts Continued monitoring, tracking and adaptive management Local working groups (local governments, watershed management groups, etc.) Winter maintenance groups (MnDOT, local governments, private applicators, **Audience** commercial property owners, residents, etc.) State agencies (MPCA, MnDOT, DNR, BWSR, etc.)

Outline of the CMP

- 1. Background and Description
- 2. TCMA Chloride Conditions
 - Water quality conditions, trends, sources and TMDL summary
- 3. Prioritizing and Implementing Restoration & Protection
 - Discuss Winter Maintenance Assessment tool, Implementation strategies, Education resources, prioritizing efforts, funding opportunities
 - Case studies
- 4. Monitoring and Tracking
 - Recommendations for continued monitoring, Tracking implementation efforts,

Sources

- Researched existing studies and information
- Refined estimate of private Parking Lot & Sidewalk application rates for MN (6.4 tons/acre/year)
- Identified all permitted entities with potential chloride discharges
 - o MS4s, WWTPs, Industrial dischargers
- Others potential sources:
 - Septic Systems
 - Fertilizers (literature values)
 - Natural Background (18.4 mg/L)

(Novotny, 2008)



Protection & Restoration Strategy

- Same BMPs for protection as for impaired waters
- Prevention is the best opportunity
- Primary objective is to get all winter maintenance programs performing at a level that is using minimal amount of salt
- Set water quality goals for point sources to work towards meeting
- Allow flexibility in implementation



Protection & Restoration Goals

- Performance based approach vs. numeric goals
- Objective is to make continued progress towards chloride reductions
 - Evaluate current practices (Id sources for WWTP)
 - Develop individualized chloride reduction plan
 - Implement practices
 - Track progress
- Set interim milestones
- Evaluate progress and water quality conditions in 10 years



Performance Based Approach - TMDLs

- Establish equitable wasteload and load allocations
- Focus less on specific numbers to meet, more on making progress with BMPs
 - Need specific number to meet TMDL requirements

TMDL = WLA (permitted) + LA (non-permitted & background) + MOS

- Measure progress by degree of implementation and trends in ambient monitoring
- Not by accounting for salt applied and comparing to individual numeric targets
- Allows for flexibility in implementation



Implementation Strategies

Implementation Strategies

- Winter Maintenance Assessment tool intended for local use to develop detailed, customized plan
- Summary of the BMP questions will be in appendix
- Focus of the strategy in the CMP will be considering big picture strategies for everyone
- Non-traditional options for low salt winter maintenance (tire strategies, alternative pavement, nonchloride deicers)
- BMPs for chloride use within traditional framework

Implementation Strategies: Traditional

- Shift from granular to liquids
- Improved physical snow removal
- Lessen ice/snow bond with pavement
- Training for maintenance professionals
- Increase knowledge of salt related water quality issues for public and elected officials



Water Softening Options

- Inform homeowners of local hardness values and recommended levels
- Convert to centralized water softening eliminate individual water softeners
- Offer rebate program to switch out old home water softeners with on-demand systems (use less salt)
- Consider non-salt water softening options

Next Steps

Timeline

- Draft TCMA chloride management plan & TMDL under MPCA review
- Expect public review *winter 2015*
- Approved plan & TMDL *spring 2015*
- Develop Winter Maintenance Assessment tool & test *early 2015*

Implementation of plan already underway!!



Questions

Brooke Asleson Watershed Project Manager 651/757-2205 <u>brooke.asleson@state.mn.us</u>

How can MPCA help organizations reduce their road salt use?

- Level I training
- Level II training
- Computer tool WMAt



Connie Fortin Fortin Consulting Inc.

MPCA: Level I Winter Maintenance Training

- Geared for maintenance workers
- Training classes are now and free!
- Started in 2006
- www.pca.state.mn.us/progra ms/roadsalt.html
 - Winter maintenance of Roads
 - Winter maintenance of Parking lots
 - Over 5,000 people have passed the certification test



Road Salt Training Schedule - 2014/2015

(Attendees Must Register with Event Contact in order to attend)

Note: 1. Classes highlighted in yellow are out of state. 2. Parking Lot Training is focused on parking lot and sidewalk winter maintenance, Road Maintenance Training is focused on maintenance of city, county and state roads.

Training Type	Event Location	City, State	Date	Time	Fee	Contact	Contact Email
Parking Lot	Freshwater Society	Mankato MN	Thursday, 18 September, 2014	8:00-1:30	00	Jeanne Prok	email leanne@freshwater.org.or.call
	,	,		1			952 471-9773
Parking Lot	Vermillion River	Apple Valley, MN	Wednesday, 1 October 2014	8:30-2:00	no	Paula Leipold	Email water@co.dakota.mn.us or call
	Watershed			1			952-891-7000
Parking Lot	Prescription	Eagan, MN	Wednesday, 8 October 2014		full	n/a	n/a
	Landscape			1			
Roads	Nine Mile Creek WD	Minnetonka, MN	Tuesday, 21 October 2014	9:00-2:00	no	Erica Sniegowski	(952) 358-2276 or
	and Riley-Purgatory					_	esniegowski@ninemilecreek.org
	WD						
Parking Lot	Nine Mile Creek WD	Eden Prairie, MN	Thursday, 23 October 2014	9:00-2:00	no	Erica Sniegowski	(952) 358-2276 or
	and Riley-Purgatory					_	esniegowski@ninemilecreek.org
	WD						
Parking Lot	RSPT, City of Duluth	Hermantown, MN	Tuesday, 28 October 2014	9:00-2:30	tbd	Adam Fulton	Email afulton@hermantownmn.com or
							call 218-729-3618
Parking Lot	Minnehaha Creek	Minnetonka, MN	Wednesday, 5 November,	9:00-2:00	tbd	Mollie Thompson	email
	WD		2014				mthompson@minnehahacreek.org or
							call (952) 641.4507
Parking Lot	Mississippi	Minneapolis, MN	Tuesday, 9 December 2014	9:00-2:00	no	Nancy Mulhern	Email nancy@fortinconsulting.com or
	Watershed						call 763-478-3606
	Mangement						
	Organization						
Parking Lot	Nine Mile Creek WD	Eden Prairie, MN	Thursday, 11 December 2014	9:00-2:00	no	Erica Sniegowski	(952) 358-2276 or
	and Riley-Purgatory						esniegowski@ninemilecreek.org
	WD						
Parking Lot	Mississippi	Minneapolis, MN	Thursday, 15 January 2015	8:00-1:00	no	Nancy Mulhern	Email nancy@fortinconsulting.com or
	Watershed						call 763-478-3606
	Mangement			1			
	Organization	1		1			

* Priority will be given to those that live or work in the Mississippi Watershed Management Organization's boundaries.

Nov 10 – Rochester Nov 20 - Shoreview

To <u>print</u> out a copy of the *Manuals* go to:





www.pca.state.mn.us/programs/roadsalt.html

Winter Maintenance Assessment Tool WMAt









To develop the logic for a computer based tool that help winter maintenance organizations:

- Document their current practices
- Chart a path towards salt reduction
- Develop a strategy unique to their operation

Why this is a useful approach

- It looks at small areas of winter maintenance
- Provides insight into current operations
- Shows user recommended practices (learning tool)
- Allows a flexible approach
- Allows you to chart your future!



Target Audience: Winter maintenance supervisors Twin Cities Metro Area



Stakeholder Process 2011-2014

- Road Salt Symposium survey
- Literature Searches
- Phone calls, phone interviews with members of the advisory team and industry experts
- Email correspondence with members of the advisory team and industry experts
- The implementation plan committee input
- Test of questions on industry pro's

The technical expert team has been formed that reflects maintenance leaders in Minnesota. These leaders represent winter maintenance of high speed roads, low speed roads, parking lots, sidewalks, deicer sales and equipment. This team has reviewed all of the logic in the questions, input screens and reports. The members are:

- Tom Broadbent -EnviroTech Services
- Bob Vasek-MnDOT
- Mike Greten -Dakota County
- Mike Scherber-Hennepin County
- Craig Eldred -City of Waconia
- Ryan Foudray -Prescription Landscape
- Joe Wiita-Scott County

- Brian Brown-Three Rivers Park District
- Kevin Nelson-City of St. Paul
- Mike Kennedy-City of Minneapolis
- Matt Morriem-City of St.Paul
- Jeff Warner-Force America
- Mark Fischbach-MnDOT



How to use the tool



User Registration Screen

Minnesota Pollution Control Agency	Home	Register About (Log in Contact
Winter Maintenance Assessment Tool (WMAt) - Registrat	ion		
Create a new Winter Maintenance Assessment Tool (WMAt) account: Email address (this will be your user ID):			
john.doe@domain.com			
Password:			
Confirm password:			
Register			
© 2014 - Minnesota Pollution Control Agency			

User Information Screen

1	17
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Welcome, john.doe@domain.com! Log out Home About Contact

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Winter Maintenance Assessment Tool (WMAt) - User Home Page

Review/update your user information:

Organization:	Cityville	
Department:	Maintenance	
Contact Name:	John Doe	
Mailing Address:	9898 West St.	
City:	Cityville State: MN	
Zip Code:	55401	
Email Address:	john.doe@domain.com	
Phone Number:	6127779999	
Notes:		
Notes about this	s user	

Create or modify an existing WMAt assessment:

Number of existing assessments: 1

Create new or select an

existing assessment:

Cityville (2013-14)

Date created: 9/24/2014 5:19 PM

Date last revised: 9/24/2014 5:19 PM

Edit Assessment



Create Assessment

Completing an Assessment



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WMAt Assessment: Cityville (2013-14)

Link to User's Home Page Table of Contents General Information General Links: Assessment Name: Cityville (2013-14) My Home Page Assessment Location: Cityville Assessment Report Report Link Questionnaire Sections Assessment Description: Assessment #1 General Information: General Information (% complete) Assessment Type(s): Best management practices (BMPs) Salt Usage/Storage Data (% complete) 0 Salt savings calculations Accuracy: <u>Calibrate</u> (% complete) Time Period(s) to Assess: Past' winter season (not selected) Application Rates (% complete) Current (2013-14) <u>Controllers</u> (% complete) Accounting (% complete) Future (2018-19) Before the Storm: Anti-Icing (% complete) Surface Type(s) to Evaluate: High Speed Roads Plow & Apply (% complete) Low Speed Roads <u>Call Outs</u> (% complete) Parking Lots Efficiency: Sidewalks / trails Deicers (% complete) Reduce Waste: <u>Storage</u> (% complete) Notes: Hauling (% complete) Questionnaire Loading (% complete) This assessment will evaluate improvements to salt management Unloading (% complete) through the future adoption of "best management practices", and Spread Pattern (% complete) **Sections** also estimate the salt savings resulting from those improved Freeze Up (% complete) Cleaning (% complete) practices. Equipment (% complete) (each section has Application Speed (% complete) Application Frequency (% complete) *multiple questions*) Date created: 9/24/2014 5:19 PM Before Winter: Policy Communication (% complete) Date last revised: 9/24/2014 5:19 PM Policy Documentation (% complete) Drainage (% complete) <u>Readiness</u> (% complete) Liquids (% complete) Training (% complete) 0 Routes (% complete) <u>Regulations</u> (% complete) Surfaces (% complete) Level of Service (% complete) After Winter: Salt Recovery (% complete)

Did you pick Salt Savings mode? Then you need to give us some numbers... Best management practices (BMPs) Salt savings calculations Welcome, tredder75@gmail.com! Log out Minnesota Pollutio Home About Contact ssessment Type(s): salt Usage/Storage Data General Jome Page Future (2016-17) Assessment Report Current (2012-13) **Questionnaire Sections:** How many salting events did you encounter (in #)? General Information: General Information (%) How much salt did you purchase? complete) Salt Usage/Storage Data (% complete) Current (2012-13) Future (2016-17) Accuracy: <u>Calibrate</u> (% complete) How much bulk salt did you purchase (in tons)? Application Rates (%) complete) <u>Controllers</u> (% complete) How much salt/sand mix did you purchase (in tons)? Accounting (% complete) Before the Storm: Anti-Icing (% complete) How much salt did you store? Plow & Apply (% complete) <u>Call Outs</u> (% complete) Efficiency: Current (2012-13) Future (2016-17) <u>Deicers</u> (% complete) How much bulk salt was stored over the winter (in Reduce Waste: Storage (% complete) tons)? Hauling (% complete) Loading (% complete) How much bulk salt remained after the winter (in tons)? Unloading (% complete) Spread Pattern (% complete) Freeze Up (% complete) How much salt/sand mix was stored over the winter (in Cleaning (% complete) tons)? Equipment (% complete) Application Speed (% How much salt/sand mix remained after the winter (in complete tons)?

Question #5

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WMAt Assessment: Cityville (2013-14)

Table of Contents

Accuracy: Controllers

General Links:

- <u>My Home Page</u>
- <u>Assessment Report</u>

Questionnaire Sections:

• General Information:

- <u>General Information</u> (% complete)
- <u>Salt Usage/Storage Data</u> (% complete)
- Accuracy:
 - <u>Calibrate</u> (% complete)
 - Application Rates (% complete)
 - <u>Controllers</u> (% complete)
 - <u>Accounting</u> (% complete)
- Before the Storm:
 - <u>Anti-Icing</u> (% complete)
 - Plow & Apply (% complete)
 - <u>Call Outs</u> (% complete)
- Efficiency:
 - <u>Deicers</u> (% complete)

Q5.	How many o	of each type of	spreader	controls do	you have?	(active fleet of	only)
-----	------------	-----------------	----------	-------------	-----------	------------------	-------

Current	Future		# of spread	er controls
(2013-14)	(2018-19)	Response	(current)	(future)
\bigcirc	۲	Electronic controls (MDSS)		25
۲	\bigcirc	Electronic controls (closed loop)	20	
\odot	\bigcirc	Manual		

View Comments Submit a Comment



Question #8



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WMAt Assessment: Cityville (2013-14)

Table of Contents	Accuracy:	Calibrate	
General Links:			
<u>My Home Page</u> <u>Assessment Report</u>	Q8. What %	6 of your fl	eet is set up for liquids (of the trucks that apply salt)?
Questionnaire Sections:	Current	Future	
General Information:	(2013-14)	(2018-19)	Response
<u>General Information</u> (%	\bigcirc	۲	80-100%
complete)			E0. 70%
 <u>Salt Usage/Storage Data</u> (% 	۲		50-79%
complete)	\odot	\bigcirc	0-49%
Accuracy:			
 <u>Calibrate</u> (% complete) 	Now Comment	a Qubmite	Comment
<u>Application Rates</u> (% complete)	View Comments	Submit a	
 <u>Controllers</u> (% complete) Accounting (% complete) 			
Before the Storm:			
Anti-Icing (% complete)			
 Plow & Apply (% complete) 			
Call Outs (% complete)			
Efficiency:			
Deicers (% complete)			

Question #12



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WMAt Assessment: Cityville (2013-14)

Table of Contents	Accuracy:	Calibrate				
General Links:						
<u>My Home Page</u> Assessment Report	Q12. What materials do you calibrate for?					
Questionnaire Sections:	Current (2013-14)	Future (2018-19)	Response			
General Information:	0	۲	For every product used			
 <u>General Information</u> (% complete) 	\bigcirc	\bigcirc	For most commonly used product(s)			
 <u>Salt Usage/Storage Data</u> (% complete) 	۲	\bigcirc	Don't calibrate			
Accuracy:						
 <u>Calibrate</u> (% complete) 	View Comments	s Submit a	a Comment			
 Application Rates (% complete) 						
 <u>Controllers</u> (% complete) 						
 <u>Accounting</u> (% complete) 						
Before the Storm:						
<u>Anti-Icing</u> (% complete)						
 <u>Plow & Apply</u> (% complete) 						
<u>Call Outs</u> (% complete)						
Deicers (% complete)						
Question #23



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WMAt Assessment: Cityville (2013-14)

Table of Contents		Accuracy:	Accuracy: Application Rates		
General Links:		Q23. Who d	letermines	(granular and/or liquid) application rates?	
• _	<u>Ay Home Page</u> Assessment Report	Current (2013-14)	Future (2018-19)	Response	
Questionnaire Sections: General Information:		0	0	MDSS preprogramed system with rates similar to MN field handbook for snowplow operators. Truck suggests the rates.	
0	General Information (%	0	\bigcirc	We use MN field handbook for snowplow operators	
• A • •	Salt Usage/Storage Data (% complete)	0	\bigcirc	We use MN parking lot and sidewalk manual application rate chart	
	<u>Calibrate</u> (% complete) <u>Application Rates</u> (% complete) <u>Controllers</u> (% complete)	0	۲	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	
• B 0 0	efore the Storm: Anti-Icing (% complete) Plow & Apply (% complete) Call Outs (% complete) fficiency:	0	\odot	We make our own application rate chart. The rates are higher than MN filed handbook for snowplow operators or the MN parking lot and sidewalk manual but much less than we used to use	
• R	Deicers (% complete) educe Waste:	0	\bigcirc	MDSS preprogrammed system with rates higher than MN field handbook for snowplow operators	
0	<u>Storage</u> (% complete) <u>Hauling</u> (% complete) <u>Loading</u> (% complete)	۲	\bigcirc	We make our own application rate chart. The rates are higher than MN field handbook for snowplow operators	
0	Unloading (% complete) Spread Pattern (% complete)	\odot	\bigcirc	Application rate charts are not used	
000000	Freeze Up (% complete) Cleaning (% complete) Equipment (% complete) Application Speed (% complete) Application Frequency (% complete)	View Comments	Submit a	a Comment	

View Existing Comments (by question)



User Comment Submittal (by question)



Reports



City #1











Past Winter Maintenance Practices City 2 Winter of 2008-2009

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.



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
- How often do you calibrate spreaders: Nevel
 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
- 8. What % of your fleet is set up for liquids (of the trucks that apply salt)? 0-49%
- 9. Where are your manual spreader control calibration charts? Not with the equipment
- 10. for manual spreader controls: do your operators know how to read calibration card? No
- 12. What materials do you calibrate for? Don't calibrate
- 26. Are your application rates based on pavement temperatures? No
- 27. Do most of your operators follow application rate recommendations? No
- 28. How do you select your application rate? Supervisor in charge: generally disregards charts and makes own decisions.
- 29. Manual controllers: when salting at different speeds how often does your crew change spreader settings: Rarely
- 32. How accurate are our salt use numbers? Low estimate at end of year
- 34. Where do you anti-ice? None of the areas we salt
- 35. When do you anti-ice? Never
- 40. What do you do with slush? Ignore it
- 59. Do we have the ability to do as much physical removal as needed to avoid over applying salt? No
- 65. What method do you primarily use for deicing (not anti-icing)? Dry salt
- 66. Are you using liquids for deicing? No
- 68. We understand the practical pavement temperature range of our deicers? No
- 69. We select appropriate material for pavement temperature? Don't adjust our product selection based on pavement temperatures
- 86. Are your trucks tarped during application? No
- 88. Where is the loading area for trucks? Outdoors
- 96. Which tools/equipment do you use to unload? None
- 98. How often is the outdoor loading area swept back into the pile? Rarely
- 117. 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)



City of Roundville Salt saving potential for one year based Winter of 2011-2012 and predicted charges for For maintenance of: High speed roads, low spectrum

2011-2012 Information

5000 tons salt stored 4000 tons salt/sand stored salt/sand 30/70 mix 1000 gallons brine stored

2000 tons salt used 1500 tons salt/sand used 500 gallons brine used

\$70.00 per Ton of salt \$1.00 per gallon of brine

80% salt used on low speed roads 20% salt used on high speed roads Prediction based on changes

Total = 234.6 tons of salt likely to be saved

Reduction Potential = 11.7%

Had these changes been made for the winter of 2011-2012, **Roundville would have saved \$16,422** in salt purchases and used only 1,765.4 tons of salt

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

Salt Savings Potential for One Year City of Roundville Parks Department 6-0 Definition of the formula of the fo

BEFORE WINTER:

0% reduction potential

DURING WINTER: 0% reduction potential

ACCURACY DURING THE STORM:

10% Reduction Potential

*0 Ground Speed Controllers with MDSS>10 Ground speed controllers with MDSS>10% Salt Savings on salt applied salt

EFFECTIVENESS DURING THE STORM

0% reduction potential

REDUCE WASTE DURING THE STORM:

22.05% reduction potential

Bulk salt pile uncovered > Bulk salt pile indoors > Salt Savings 17% of salt in storage

Salt/sand pile uncovered> Bulk salt pile indoors > Salt Savings 17% of salt in sand pile

Receive shipments outdoor with good clean up > Receive shipments indoors > Salt savings .05% of salt ordered

Use up all salt at end of winter > give away salt at end of winter > 5% of total salt purchased

RECOVERY OF SALT: <u>0% reduction potential</u>

Legend:



- Best Practice
- Advanced Best Practice

MPCA: Level 2 Winter Maintenance Training

- Coming soon
- Will give users classroom training on how to use the WMAt
- Will likely provide advanced training on other winter maintenance issues
- Will be selecting advisory team to guide training contents....any volunteers?



Questions?

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