

TMDL Strategy: Training to Motivate Change



Case Study : Chlorides/ Road Salt

- Problem - No method for removing chlorides
 - Solution – Prevent them from being used
- GOOD LUCK

- A conservative toxic pollutant
- **Does not breakdown**
- MN has little natural chloride in our water
- **Levels are rising in lakes, streams and ground water**
- Problem is invisible



Chronic Chloride Standard
230 mg/l
= 1 teaspoon salt
in 5 gallons water



An estimate of road salt applied by the municipalities in the **Metro** area is **238,000** tons per season.

Novotny, Sander, Mohseni
and Stefan, 2007



Polluting about 176,296,000,000 gallons of
water each year

How to remove chlorides?

- Reverse Osmosis
- Evaporation

Are we ready to do this for our lakes, rivers and groundwater?



Can you think of a more difficult Non-Point Source Pollutant to deal with?

Clean Water



Public Safety



Environment



Transportation

Work together to understand issues on both sides. Unless you have regulations you must form a partnership with the industry you hope to change.

Difficulties



- Salt is unregulated, no legal reason to change
- Salt bad? But we put it on Popcorn...can't be a problem. Lack of understanding of the problem
- Myth – Public safety or Clean water...choose one
- Environmental and transportation pro's not focusing on chloride pollution
- Broad salt user audience (state, county, city, private and homeowner)
- Salt is the cheapest deicer
- We have been using salt for 30 years. It is a habit
- Legal claims for slip and falls or crashes. More salt is better.
- Very little public, political or user awareness of the problem.

Hypothesis: If we can fix the chloride problem we can fix any NPS problem

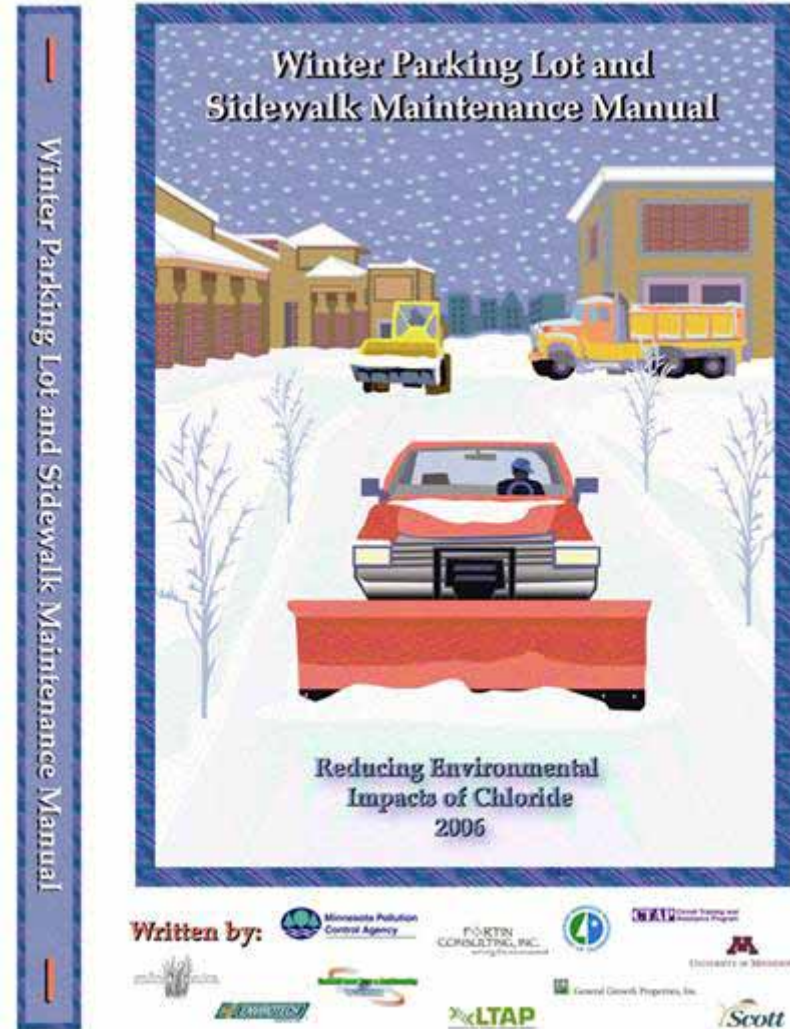


Training Program

MPCA “P2” grant \$50,000

- funded research and development
- Funded training manual, clipboard development and printing
- Funded 3 trial training classes

Target Audience – Private Companies that maintain sidewalks and parking lots



Training contents

- Positive Attitude 😊
- BMPs
- Save \$
- Environmental impacts
- Reduce salt use
- NO decrease in public safety

Winter Parking Lot and Sidewalk Maintenance

Key Information Needed:

- Pavement Temperature (it will be different than air temperature)
- Parking lot area: (or drive lane distance) × Length × Width
- Amount of material your truck or spreader delivers at each setting and speed.

TIPS:

- Deicers melt snow and ice. They provide no traction on top of snow and ice.
- Anti-icing prevents the bond from forming between pavement and ice.
- De-icing works best if you plow before applying material.
- Pick the right material for the pavement temperature.
- Sand only works on top of snow as traction. It provides no melting.
- Anti-icing chemicals must be applied prior to snow fall.
- NaCl (road salt) does not work on cold days, less than 10° F.

Use best! About one ton of salt contaminates 5 gallons of water.

Melt Times for Salt (NaCl) at Different Pavement Temperatures

Pavement Temp. °F	One Pound of Salt (NaCl) melts	Melt Times
30°	46.3 lbs of ice	
25°	14.4 lbs of ice	5 min.
20°	8.6 lbs of ice	10 min.
15°	6.3 lbs of ice	20 min.
10°	4.9 lbs of ice	1 hour

Dry salt is ineffective and will blow away before it melts anything.

Melting Characteristics

Chemical	Lowest Practical Melting Temp.
CaCl ₂ (Calcium Chloride)	-20° F
KAc (Potassium Acetate)	-15° F
MgCl ₂ (Magnesium Chloride)	-10° F
NaCl (Sodium Chloride)	15° F
CMA (Calcium Magnesium Acetate)	-20° F
Blends	Check with manufacturer
Water Sand/Abrasives	Never melts—provides traction only

Pick your material based on lowest practical melting temperature, not eutectic temperature which is often listed on the bag.

Variables affecting application rate

Increase rate if:	Decrease Rate if:
Compaction occurs & cannot be removed mechanically	Light snow or light freezing rain
There is a lot of snow left behind	Pavement temperature is rising
	Subsequent applications

Help protect our lakes, streams, wetlands, and drinking water!

Use best practices for winter maintenance.

Minnesota Pollution CONTROL AGENCY
 T-MARTIN CONSULTING, INC.
 CMAP Circuit Training and Assistance Program
 UNIVERSITY OF MINNESOTA
 Scott <LTAP>
 General Growth Properties, Inc.

July 2006 File available at www.pca.state.mn.us/roadsalt

Trial Training Results

Good training materials

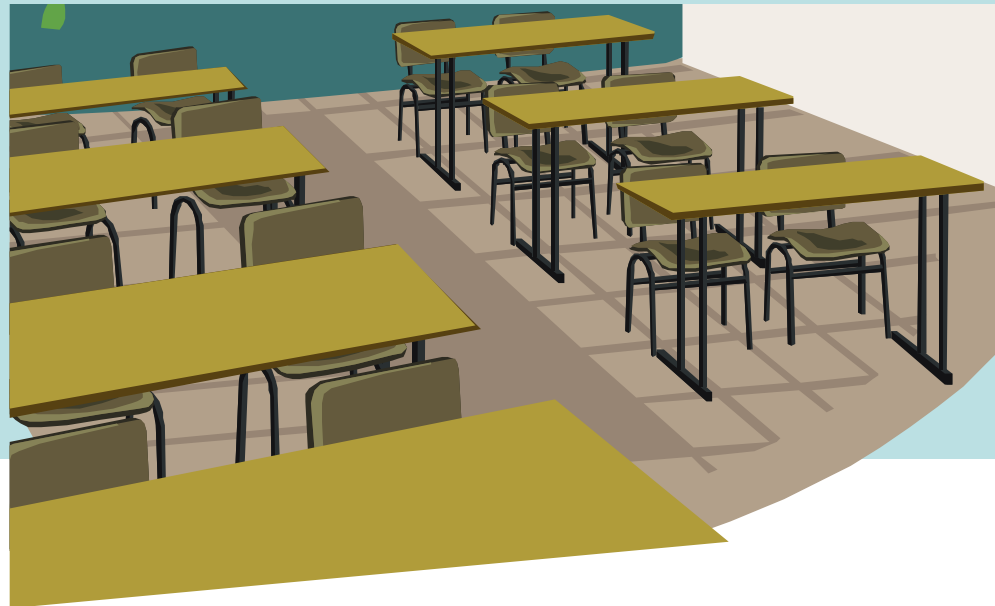
Good teachers (**environmental and transportation**)

Great partners to help promote training

Great results and feedback from Attendees

But Poor Attendance

*&@#@(!



Why didn't they come?

Not required by law, not paid to come, ????



MPCA rises to the occasion

- Andrew Ronchak and others found a way to get a voluntary certification program started at MPCA
- First time for a non-regulated substance
- MPCA acted quickly & decisively delivering a new NPS tool



Instantly fixed the poor attendance problem

MINNESOTA POLLUTION CONTROL AGENCY

Level I Certification

**Snow & Ice Control
Best Practices**

This is to Certify that

Roman Rowan

Snow King Inc.

has passed the certification examination
and has volunteered to apply snow and
ice control best management practices
for parking lots & sidewalks.



**Minnesota
Pollution
Control
Agency**

*YOUR KNOWLEDGE AND ACTIONS WILL HELP
PROJECT MINNESOTA LAKES AND STREAMS*

Date: _____



Road Salt Applicators Training Certificate Holders

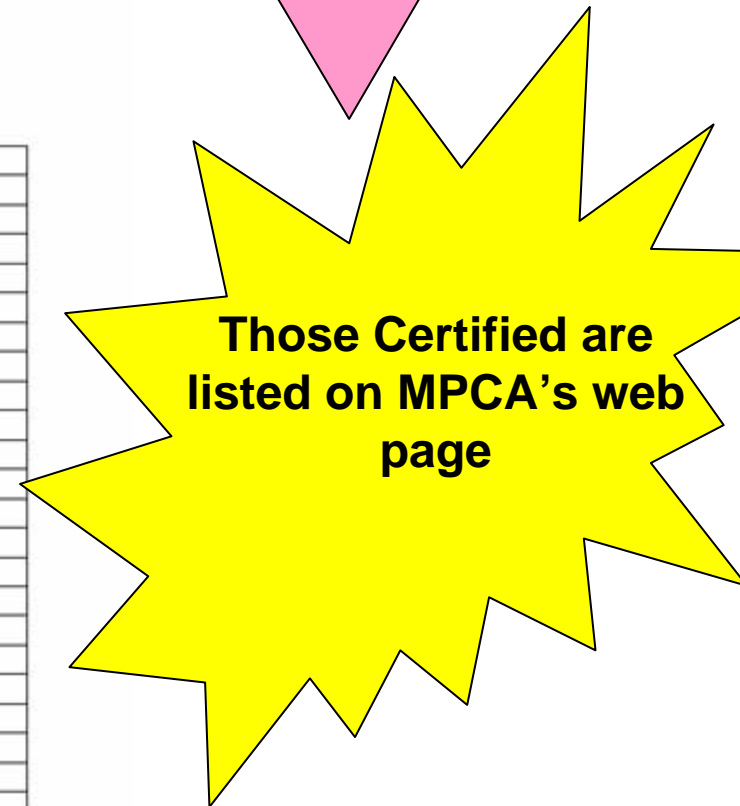
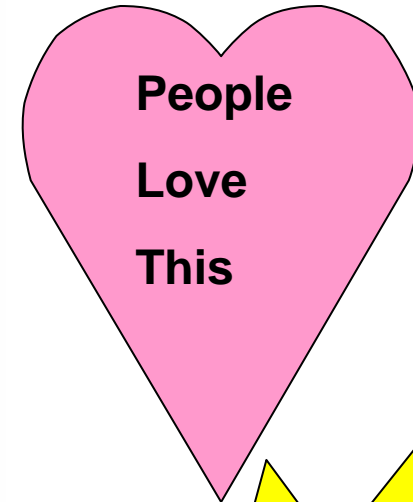
Planning/Training/#1.01 December 27, 2007

List of individuals certified (alphabetical order)

A voluntary environmental commitment certification was given to individuals who:

- Attended voluntary Road Salt Training;
- Completed and passed the associated test; and
- Agreed to voluntarily apply Best Management Practices to reduce chloride impacts.

No	FName	Lname	Company
1	Jesse	Abraham	
2	Scott	Abrahamson	UW Superior
3	Bob	Adams	City of New Prague
4	Jesse	Adkins	Northland College
5	Nicholas	Ahrens	SMSC
6	James	Aiken	Village of Superior
7	Mike	Alery	Lynde Enterprise
8	Jeffrey	Alexander	Douglas Cty
9	Chuck	Allen	City of Hopkins
10	Mike	Amsden	City of CrossLake
11	Shawn	Anderson	City of Edina
12	Shawn	Anderson	City f Edina
13	Steven	Anderson	MN Correctional Facility - Red Wing
14	Steven	Anderson	Crystal Cabinet Works
15	Matt	Arant	Regency Pointe Apartment Homes
16	Brian	Armstrong	City of Alexandria
17	Julie	Arndtson	3M Cottage Grove
18	Kseniya	Arsenyeva	Fortin Consulting
19	Chuck	Autio	City of Plymouth
20	Walter	Avery	UW Superior
21	Paul	Babb	City of Plymouth
22	Michael	Bahe	University of MN
23	Shawn	Baird	City of Maple Grove
24	William	Barnes	City of Minneapolis
25	Kandice	Barnes	Hennepin County, Property Services
26	Kaleb	Barrett	Advantage Landscaping



\$ for Training

MPCA comes through again.
Tim Larson – Metro Basin
Coordinator encouraged us
to seek 319 funds to
launch the program
Now in 2nd of 3 year training
grant



Started in fall of 2006

Projected Results

In Class survey of Best Practices

averaged from most recent 11 training classes

- BMPs already followed 35%
- New BMPs that will be tried 38%
 - (will, might, won't)
- Total BMPs adopted 75%

Projected Results

In Class Rate Reduction Exercise

averaged from most recent 11 training classes

Average potential reduction in salt application rates 62%

Actual Results



Nearly 1,000 people certified in 2 years

Nearly 100% of those surveyed would recommend the class to others

Dear Carolyn:

Sam Dailey, a **foreman in Property Services, Public Works**, for the **City of Minneapolis**, dropped by the office (our Mississippi Watershed Management Organization office in Lauderdale) in hopes of picking up eight copies of the Winter Parking Lot and Sidewalk Maintenance Manual to share with men with whom he works at Property Services in the City of Minneapolis. He had **attended the workshop** himself and **was very impressed** with it. He said **he was very surprised to learn so much about a subject that he thought he knew.**

He came out of the building where he works yesterday morning and saw a thick ring of salt on the sidewalks around the building. Recognizing the folly of that approach to salting, he personally hoped to change a few minds concerning overkill salting by sharing information with his Property Services Group. On later thought, **he felt that all the bridge workers, equipment workers and street workers who work for the City of Minneapolis should take the workshop** because they, too, could learn a lot, as he did, and **they could prevent a lot of environmental damage.**

All in all, Sam thought the workshop was terrific and wanted others to have the opportunity to learn what he had. He was incredibly grateful for having had the opportunity to take it and wanted the wisdom shared.

Since this letter over 200 city of mpls workers have been trained

Zhenya Stone. MWMO Office Administrator

Scott County Example

- “Prior to calibration, accounting for usage and training our operators we used 9,500 tons per year of salt. We have not exceeded 7,500 tons since we trained our operators in sensible salting and calibrated our sanders. “

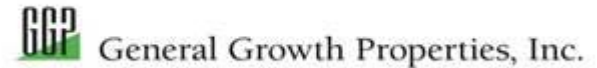


Ridgedale Mall

Parking Lot/Sidewalks/Service Roads

80 acres BIG!

**Real
Reductions
50-75%**



Before training they would typically apply **10-12 tons** of rock salt following a one day storm event

Since training they have been concentrating on mechanical removal and are applying **3- 5 tons** of rock salt following a one day storm event. They say there is still room for improvement but they are excited about the changes they have tried so far



UNIVERSITY OF MINNESOTA

Material Reductions:

Road Salt: 617 tons (68%)

MgCl₂: 80 tons (65%)

Sand: 288 tons (92%)

Total: 985 tons

Started new anti-icing program

Cost savings: \$55,070 after \$10,000
equipment investment

Actual Results

- As for the state budget...The salt savings at the U of M alone in one year paid for the P2 grant to develop training.



Unexpected Training Results

City, County
and state
plow drivers
started
showing up at
our training
and
certification
program...



Add Road Certification

- MnDOT, MPCA, U of M and Fortin Consulting met and acted quickly
- Funded by partners, developed by FCI.
- Road certification training based on parking lot training.
- MPCA agreed to offer certification
- Trial classes this winter
- Results look fantastic

Results of Road Trial Classes

- Good attendance
- Good projected reductions
- MnDOT already is proposing a fall tour of 20 training classes. Funded by MnDOT



Water and \$ saving potential

Org.	#	Drivers per location	Lbs of salt per person per year	MILLION gallons water impaired per person per year	Cost savings in salt purchase per person at 10% reduction	Total cost savings in salt purchase per year at a 10% reduction	Total TRILLION of gallons of water protected per year at a 10% reduction
MnDOT shops	150	11	220,000	44	\$550	\$907,500	7
City	854	5	300,000	60	\$750	\$3,202,500	26
County	87	15	600,000	120	\$1,500	\$1,957,500	16
Total						\$6,067,500	49

These are rough estimates used only to illustrate a point

This Minnesota data may not be accurate

How we are addressing Non-point source pollution

- Training – Nothing new here
- Testing – Causes people to pay attention and learn
- Certification – Creates a demand for training
- Behavior change
 - Inspire change: Tell people they are important and appreciated. Don't accuse them of being the problem.
 - Training must show benefits (to the individual, the company, the world) if they follow the training advice.
 - Assist change: Need to give them practical information & resources that will help them make changes

Certification may change the way we deal with NPS

- It is new
- It offers hope
- Tired of workshops with poor attendance
- Tired of newsletters that aren't read
- Focus in on a group that would benefit from certification
- Amazing results may come your way

My wish...

- Get all MN snow and ice professionals trained
- Turn MN chloride reduction program into a national program
- Test the certification model on another pollutant
- Help others to explore this new opportunity in NPS pollution reduction

