

# Today's outline:

- 1) Why Salt Wise?
- 2) What's in your toolbox?
- 3) Plan like Pete
- 4) Demystifying Deicers



# Wisconsin Salt Wise Partnership

A coalition of organizations coming together to reduce salt pollution in our lakes, streams and drinking water.



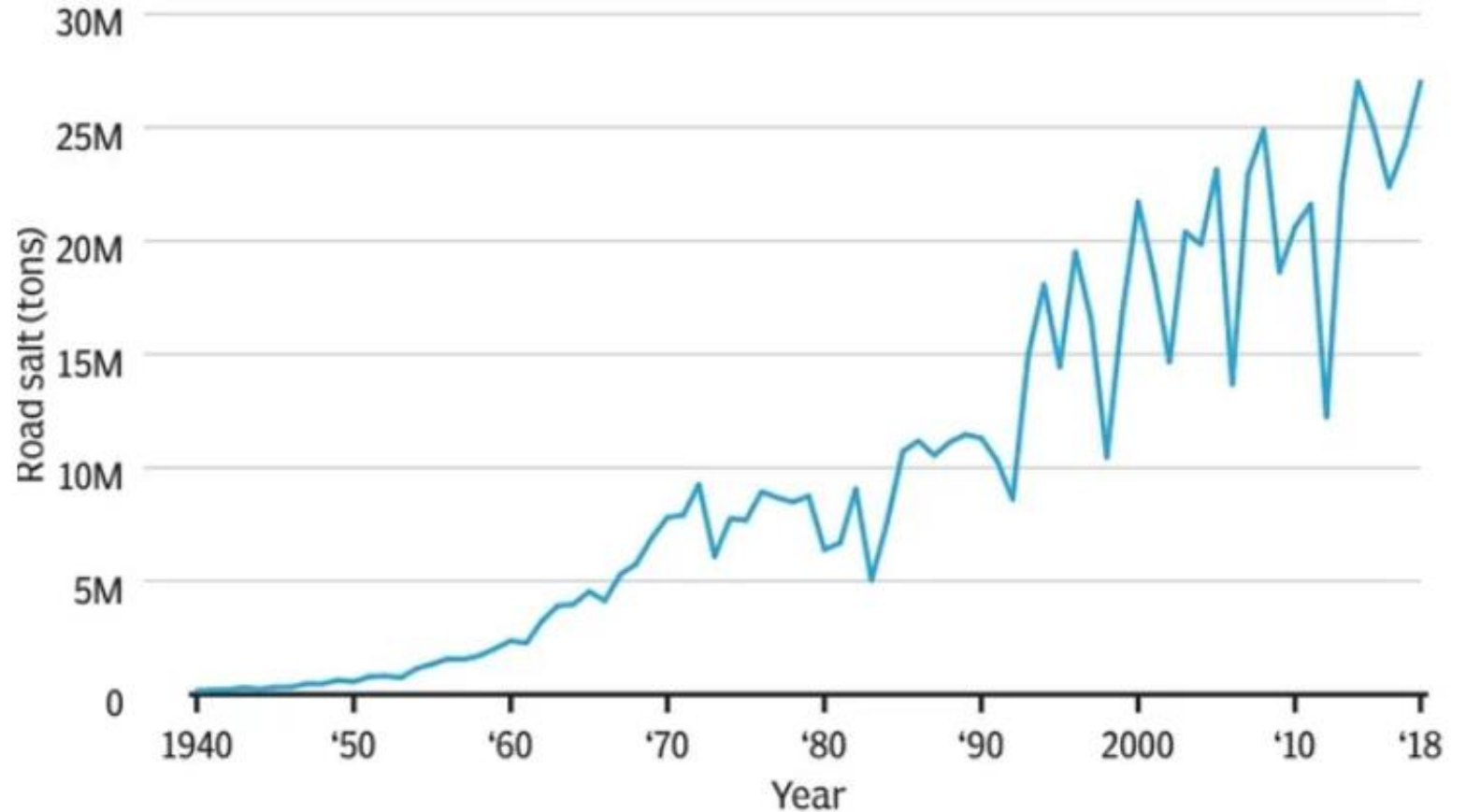
~~“This is the way we’ve always done it.”~~





# America's road salt history

The U.S. Geological Survey tracks the amount of salt used in the U.S. each year, including for de-icing. Figures show a sharp upward trend since salt was first used on wintry roads in the 1940s.\*

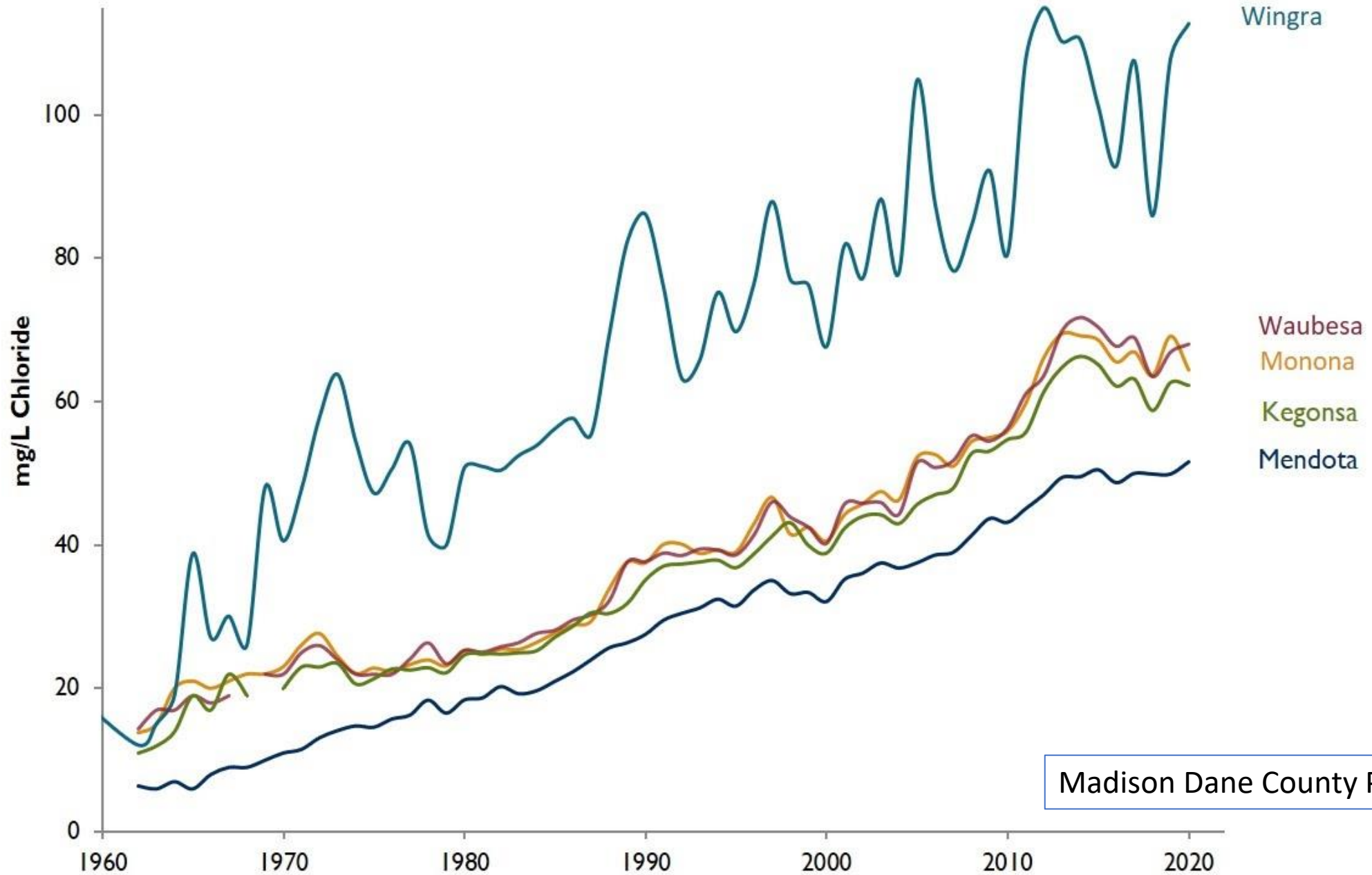


\*1940-1953: "Highways, railroads, and other dust and ice control", 1954-1971: "States, counties, and other political subdivisions", 1972-1984: "Highway use", 1985-2016: "Ice control and/or stabilization", 2017-18: Estimates

Source: U.S. Geological Survey

CARLIE PROCELL/USA TODAY NETWORK

# Yahara Lakes Annual Chloride Levels



Madison Dane County Public Health

# Chloride in our Lakes and Rivers

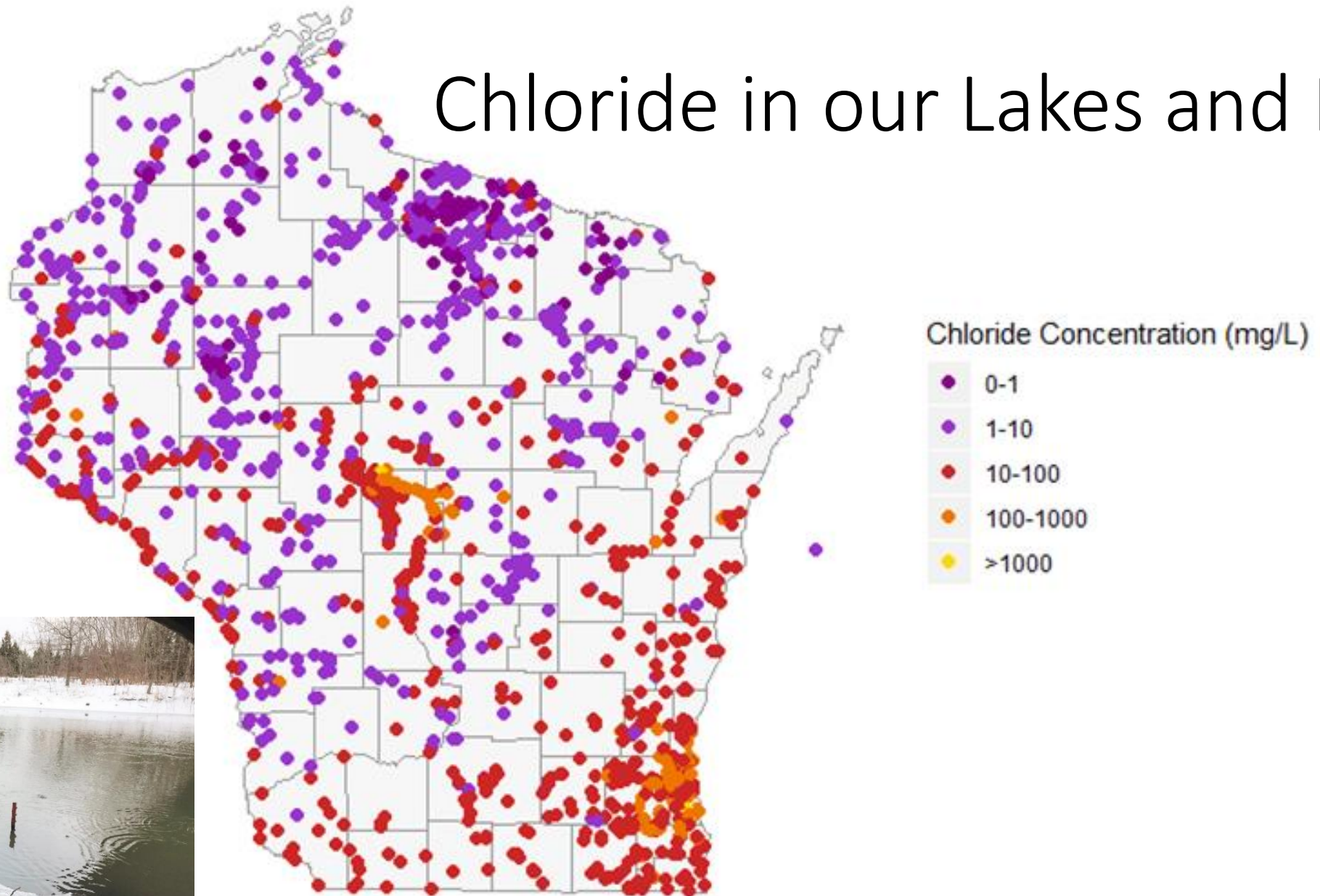
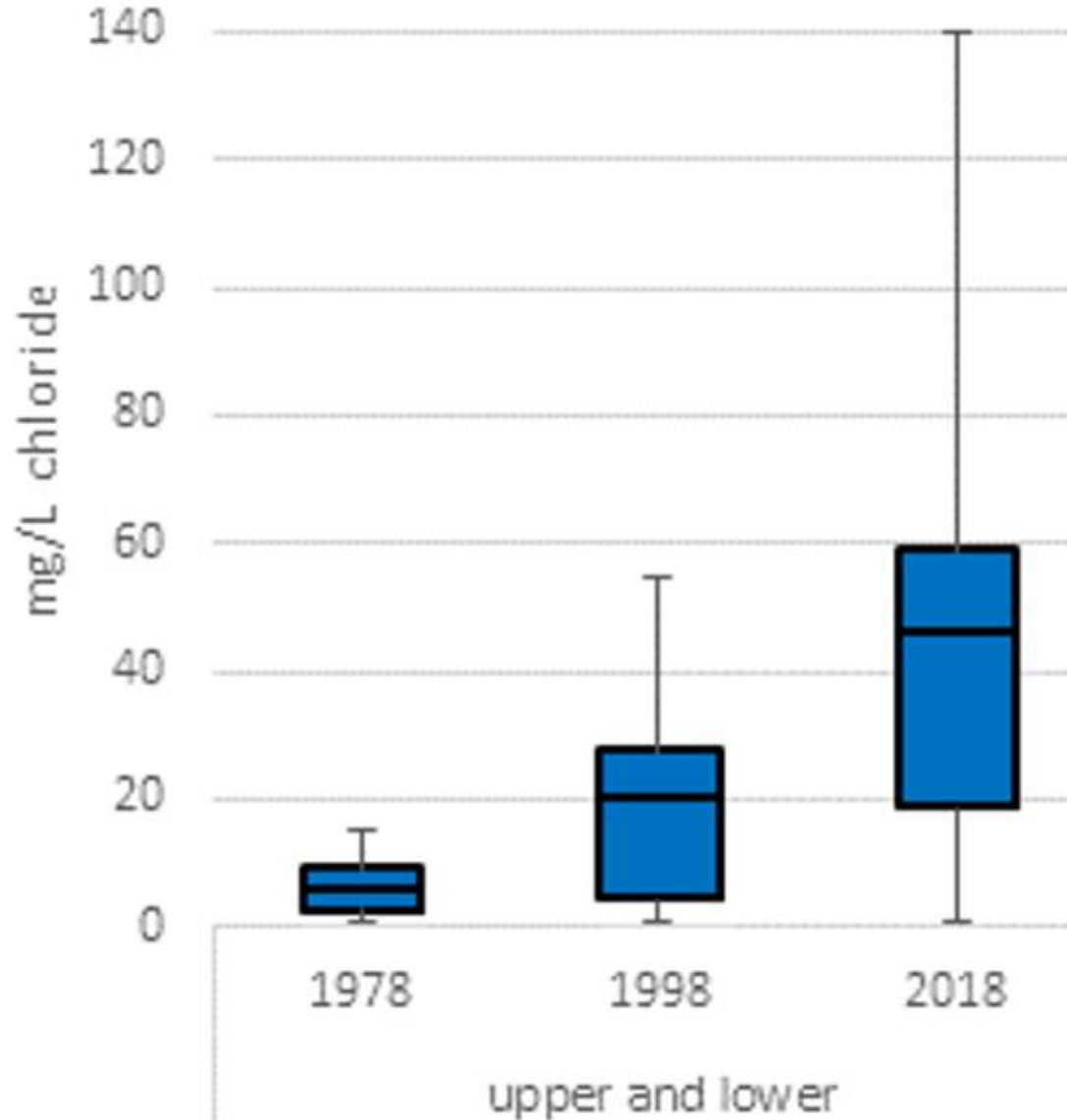


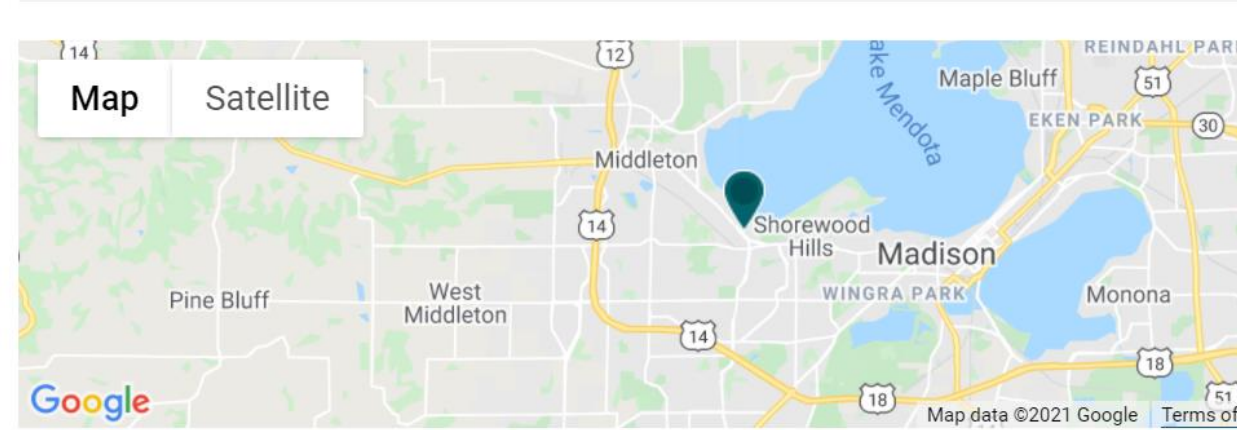
Figure by Linnea Rock using data from [waterqualitydata.us](http://waterqualitydata.us)

# Chloride in Madison Drinking Water Wells

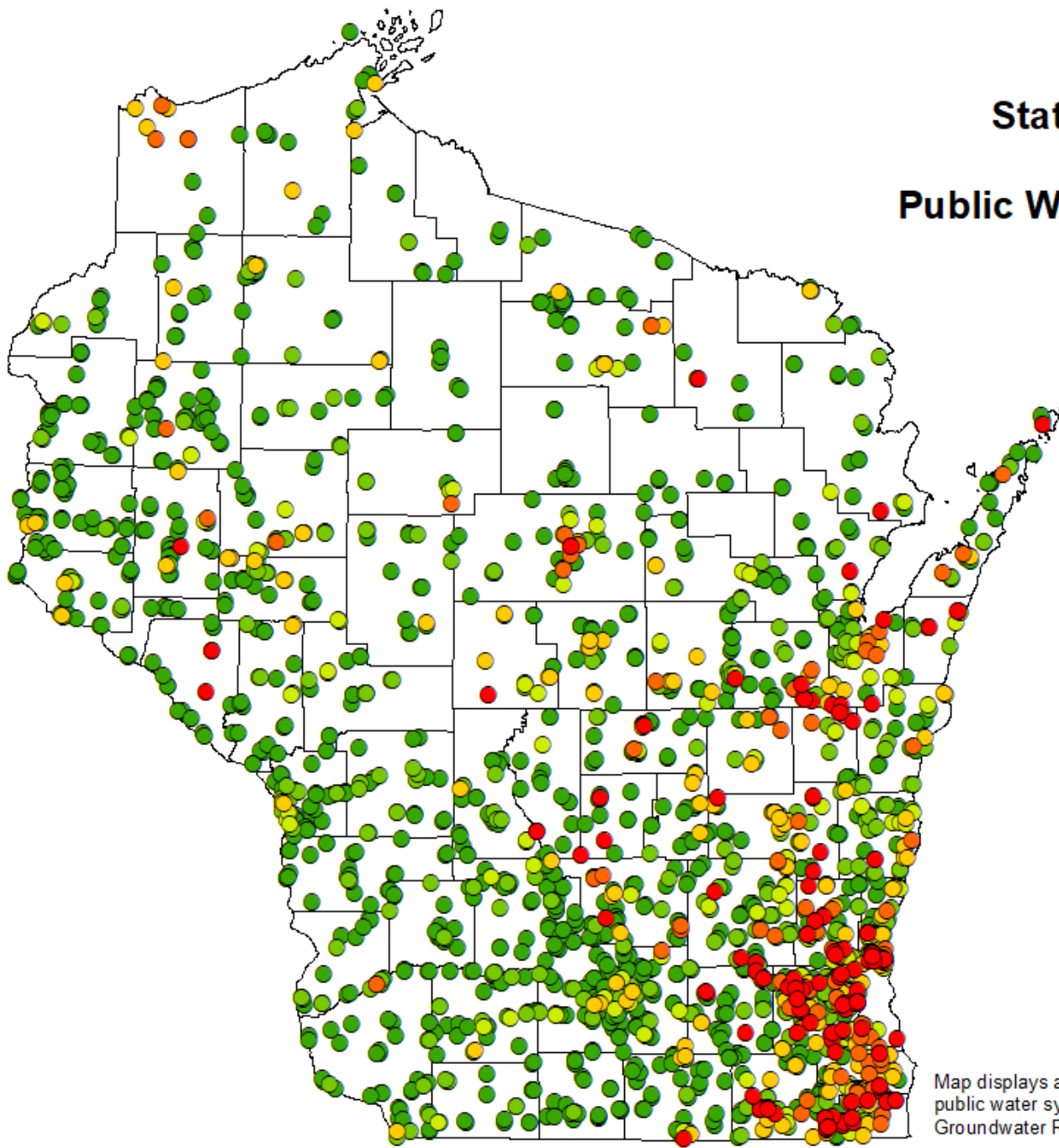
Madison Dane County Public Health



## Road Salt Study at Well 14



# State of Wisconsin Public Water System Results



## Sodium (mg/l)

- ... 10
- 11 - 20
- 21 - 30
- 31 - 60
- 61 - 100
- 101 ...



Map displays average sodium concentrations from data on public water systems downloaded from the Wisconsin DNR Groundwater Retrieval Network through December 2022.



Why use salt to help us meet our winter maintenance goal? Why not use it to the max?

**Why Salt?**

**Why Not?**



## 2023 SENATE BILL 52

# GREEN SNOWPRO: LIABILITY PROTECTION IN NH

WITH  
AUBREY, STEVE, & TED,  
NEW HAMPSHIRE DES

WEDNESDAY, APRIL 5

**LIVE 12.00 PM CT**



## WEDNESDAY WEBINARS

WITH OUR  EXPERTS

damages arising from a hazard resulting from the accumulation of snow and ice on any real estate maintained by the certified commercial applicator when the hazard is caused solely by snow or ice and the certified commercial applicator used methods for snow and ice removal and deicer application that are taught in training approved

# Average Statewide Salt Price Trend



Year	Statewide (\$/ton)
01-02	\$29.92
02-03	\$29.96
03-04	\$30.57
04-05	\$32.21
05-06	\$34.98
06-07	\$39.03
07-08	\$41.69
08-09	\$47.91
09-10	\$60.92
10-11	\$58.55
11-12	\$59.18
12-13	\$58.34
13-14	\$60.78
14-15	\$69.01
15-16	\$71.35
16-17	\$68.74
17-18	\$67.60
18-19	\$73.51
19-20	\$77.10
20-21	\$80.09
21-22	\$81.80





\$2 billion/year



\$5+ billion/year

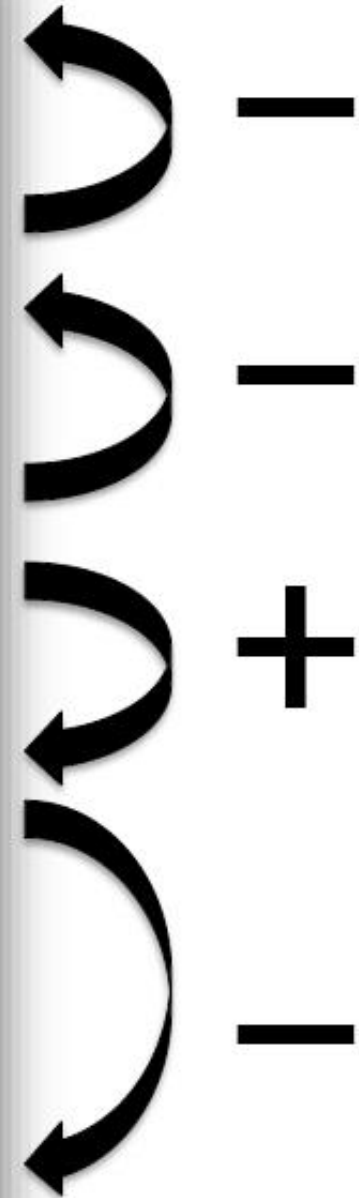
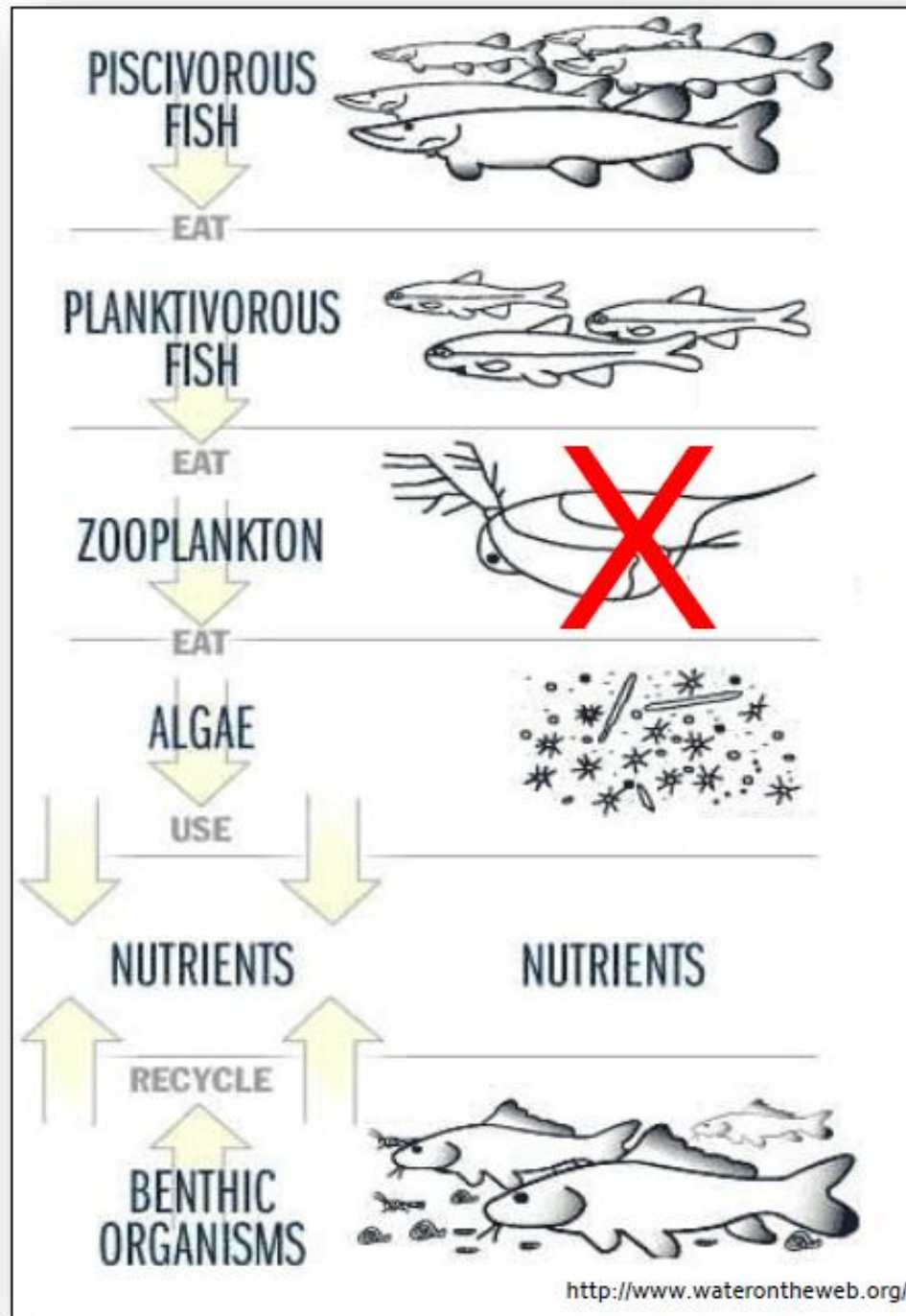


\$1 salt = \$10 damage

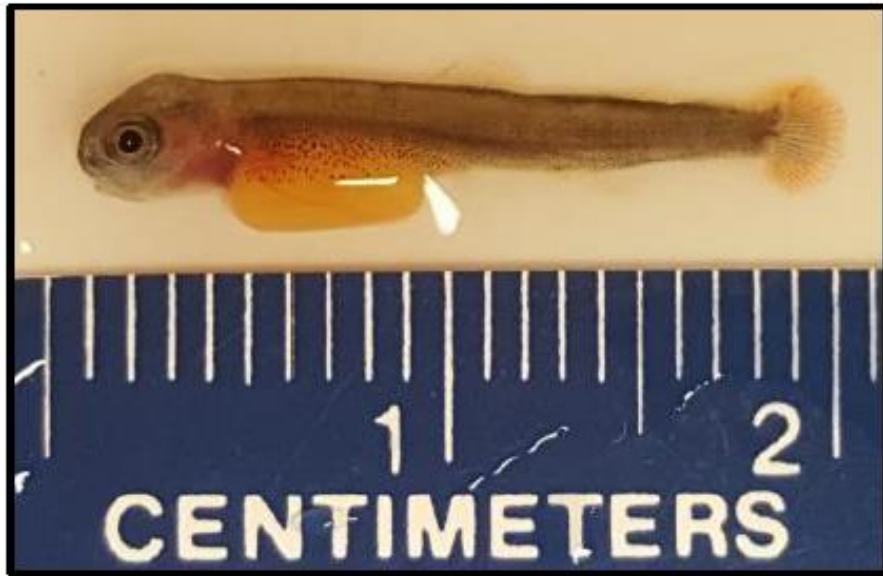


\$3 billion/year





After 25 days



**Bill Hintz,**  
University of Toledo

# Excess Salt

- ~~Keeps us safer~~
- Damages infrastructure
- Degrades freshwater







What's in your toolbox?



# Maximize mechanical



## University of Wisconsin-Green Bay

### BACKGROUND

After taking the Salt Wise training in 2019, UW-Green Bay grounds administrators committed to improving practices on campus. From education and equipment upgrades, to changing when and how they salted, an overhaul of their winter maintenance program resulted in huge salt savings. An indirect benefit was a reduction in damage and cleaning inside buildings.

### OVERVIEW

#### Salt Savings:

Winter 2018-2019: 325 tons  
Winter 2019-20: 163 tons  
Winter 2020-21: 66 tons  
Total Reduction: 80%

#### Budget Numbers:

\$30,500 in salt savings over two years  
Labor needs and costs decreased

### CHLORIDE REDUCTION STRATEGIES

#### New Methods:

- In-house training for all custodial staff and resident assistants on the environmental impacts of salt, salt use best practices, and the new policies.
- Emphasis on mechanical removal (only spot treating with salt) during the storm.
- Frequent monitoring of pavement temperature to inform salt application rates.

#### New Equipment:

- 1-ton pickup outfitted with ground speed control, air and pavement temp. sensors.
- New plows for front loaders enabled the more efficient movement of snow.
- A sectional plow blade that conformed to pavement crown or unevenness.
- Brooms for skid steers produced a better result in less time.

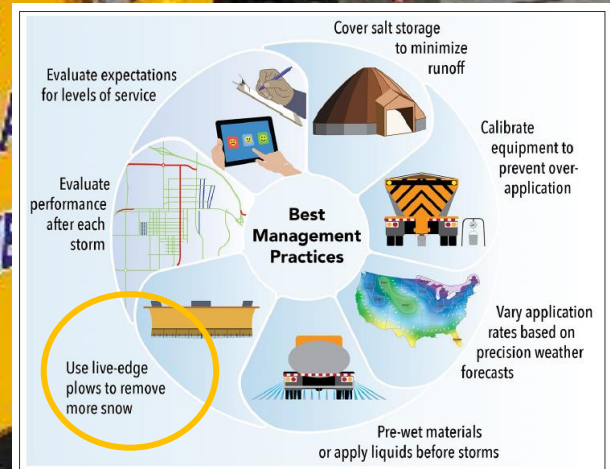
“

The Salt Wise class opened up a whole new world.

Brad Gajeski, UWGB Facilities and Planning

”







-Skidsteer w/ Sweeper



-Ventrac SSV w/ Blade, Sweeper, & Snow Blower



A person wearing a dark jacket, blue pants, a black beanie, and a light blue face mask is pushing a red walk-behind brusher on a concrete sidewalk. The sidewalk is partially covered with snow. In the background, there are residential buildings and trees. The scene is outdoors in winter.

# Walk-behind Brushes Review

AK Rock Hobbies



Plan like Pete

**ASM** ADVANCED SNOW MANAGER™  
SERIOUS TRAINING. SAFER PEOPLE. STRONGER OPERATIONS.  
CERTIFICATE OF...

NICOLET ENTRANCE  
Highway 54/57 and Nicolet Dr. Exchange to Nicolet Entrance

Legend:  
Bark Paths  
Ponds  
Observation Points  
Weidner Carillon

Entrances = Fri  
as  
Randy + Ty - Floate

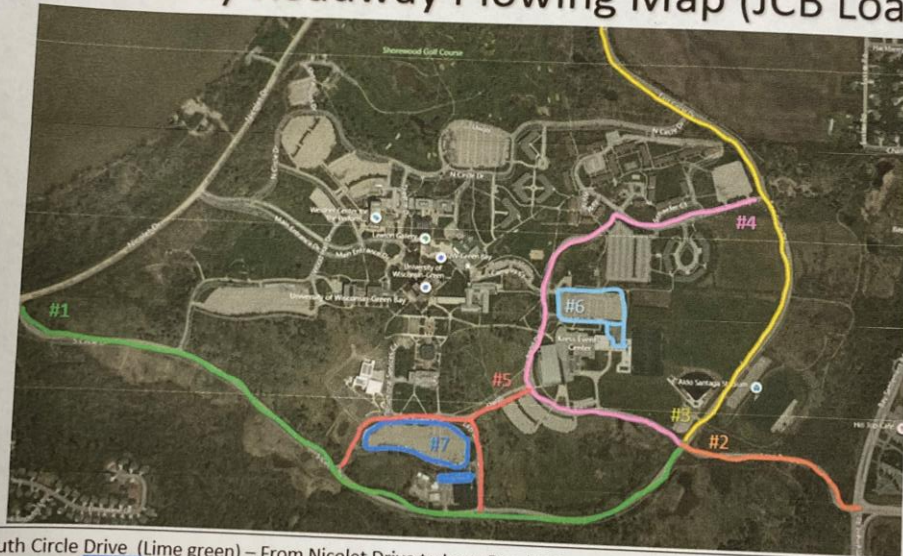
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**Roadway/Parking Lots/Loading Dock Campus Overview**

**Snow Routes by Operator**

-Operator #3 – JCB Front End Loader w/ KAGE Pusher/Plow

**UW Green Bay Roadway Plowing Map (JCB Loader)**

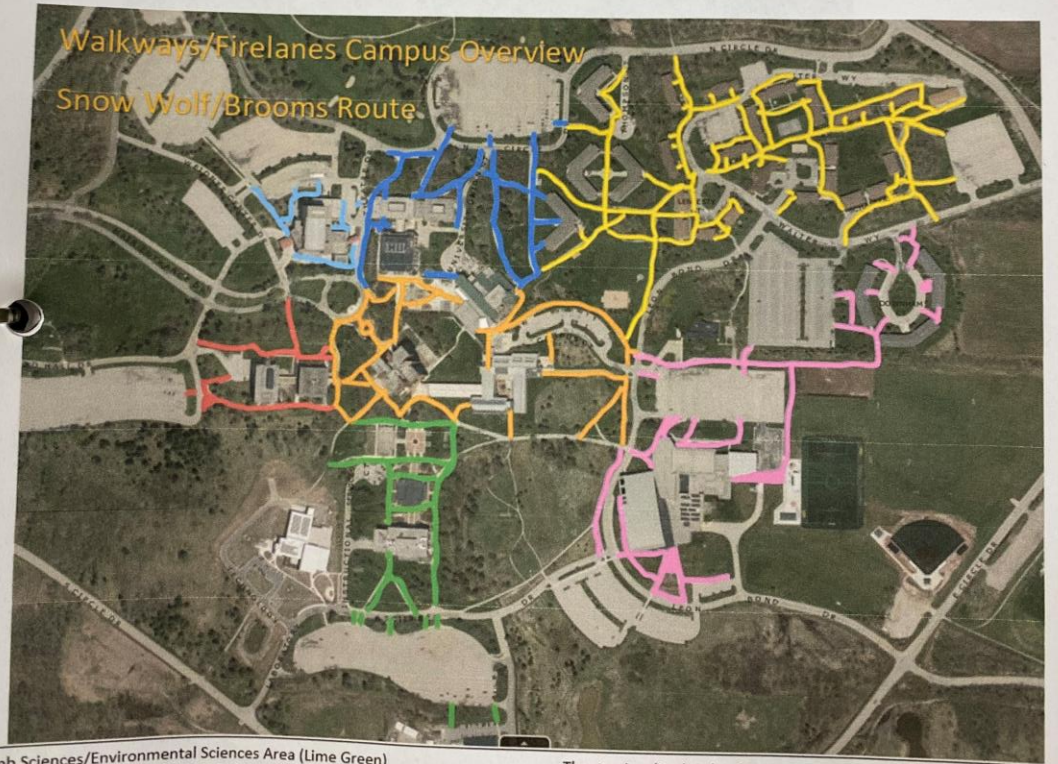


- Plow South Circle Drive (Lime green) – From Nicolet Drive to Leon Bond Drive – Plow both directions to clear entirely
- Plow Leon Bond Drive (Orange) – Up to Bay Settlement Entrance – Plow both directions to clear entirely
- Plow East Circle Drive (Yellow) – Up to Scottswood Drive – Plow Both Directions to clear entirely
- Plow Walter Way (Pink) – From East Circle Drive to South Circle/Leon Bond Intersection – Plow both directions to clear entirely
- Plow Lab Sciences Drive (Red) – From Walter Way to both South Circle Drive Entrances – Plow both directions to clear entirely
- Plow Kress Center Parking Lot (Light Blue) – Plow Kress Lot according to Mapping
- Plow Lab Sciences Lot & Facilities Side Parking Lot (Blue) – Plow Lab Sciences Lot & Facilities parking lot according to Mapping

**Walkway/Fire lanes Campus Overview – Snow Routes by Operator**

- Operator #1 & #2 (Skidsteer w/ Snow Wolf Pusher & Skidsteer w/ Sweeper)
- Operator #6 (Ventrac SSV w/ Plow & Sweeper(Housing Only))
- Operator #8 (Kubota Tractor w/ Sweeper)

**Walkways/Firelanes Campus Overview  
Snow Wolf/Brooms Route**

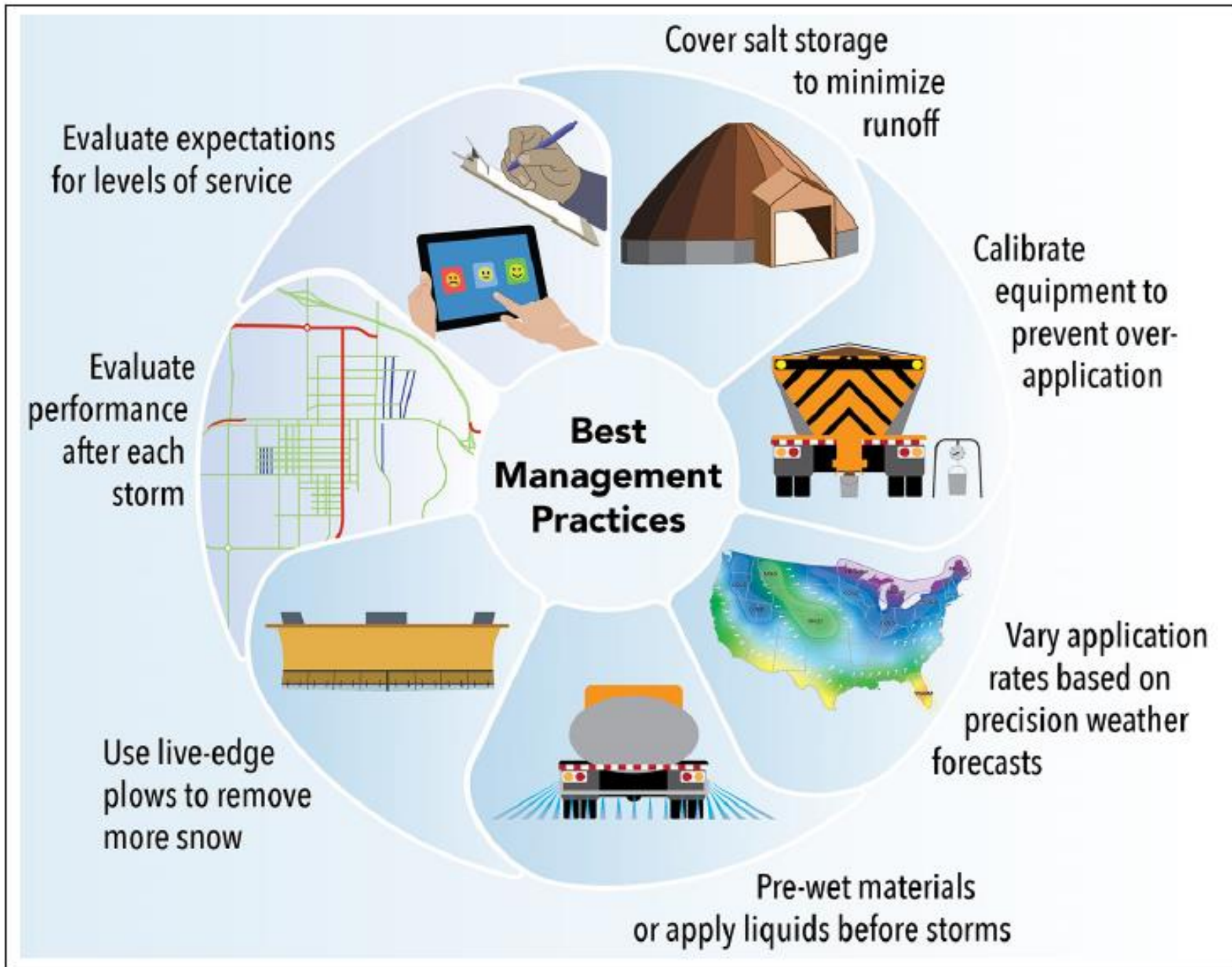


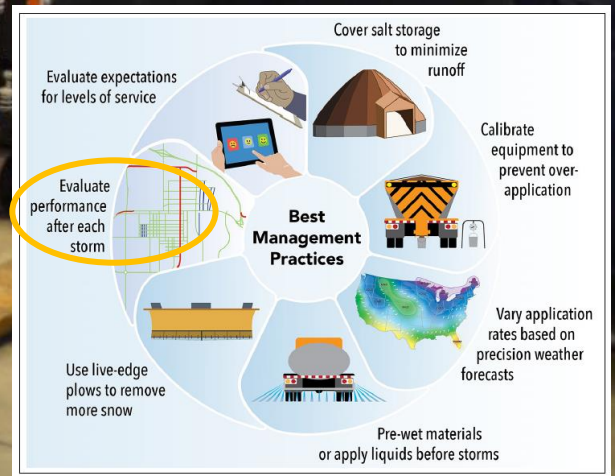
- Lab Sciences/Environmental Sciences Area (Lime Green)
- Wood Hall/Rose Hall Area (Red)
- Library/Student Services Plaza/University Union/MAC Hall (Orange)
- Weidner Center (Light Blue)
- Theatre Arts/Back Side of University Union (Blue)
- Kress Center/Mauthe/Downham Court (Pink)
- Housing/Maintenance Building (Yellow)





1. Push Snow From Roadway entrances into parking lot (#1,2,3)
2. Take one lap around the inner perimeter of the baired parking lot to determine the edges, also go around parking lot islands as well
3. Follow the arrows in the diagram to which direction the snow needs to be pushed
4. Clear out all entrances a second time once all snow has been removed from the lot and is up on the





# Anti-icing Data Form

Name: Angie

Date: 1/30/17

$$\begin{array}{r} 3.75 \\ 2.25 \\ \hline 6.00 \end{array}$$

Air temp	pavement temp	RH	Dew Pt.	Sky
22	23	68	13	overcast

Reason for applying:

now inforecast for after noon

on:

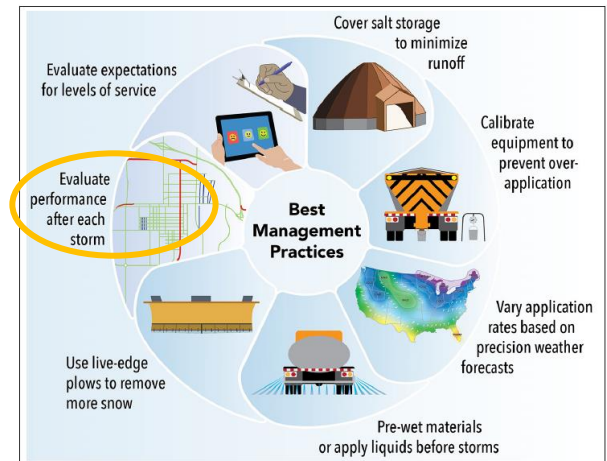
Application Time: 10 AM - noon.

Application Amount: 100 gell

Observation 1st day, after event

## Salt Tracking for Truck 2

Date Loaded	Scoops loaded (to the nearest 1/2 scoop)	Use it all up? (✓)	Date Emptied	Scoops unloaded (to the nearest 1/2 scoop)	Total scoops used
1/3/17	1 1/2		1/5/17	1/2	1
1/9/17	1	✓			1
1/10/17	3	✓			3
1/11/17	1	✓			1
1/12/17	3	✓			3
1/13/17	1	✓			1
1/16/17	5	✓			5
1/16/17	3	✓	<del>1/16/17</del>		3
1/17/17	5	✓			5
1/18/17	3	✓			3
1-24-17	1				
1-25-17	1			1 1/2	2
1-26-17	1			0	1
1-27-17	1				
1-31-17	2	✓	1/31/17	1	2
2-1-17	3	✓	2-1-17	3	3





WI Salt Wise is at University of Wisconsin-Madison.

Published by Instagram · December 8, 2021 · Madison, WI

Salt Wise Hack #1: Close down unneeded stairs, entrances, etc. for the winter. #saltwiseshoutout to @uwmadison for reducing salt use and protecting freshwater. #keepitfreshwi #snowiscoming



323

People reached

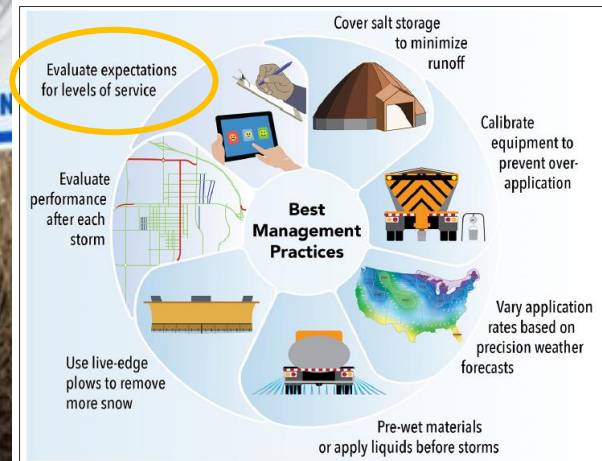
27

Engagements

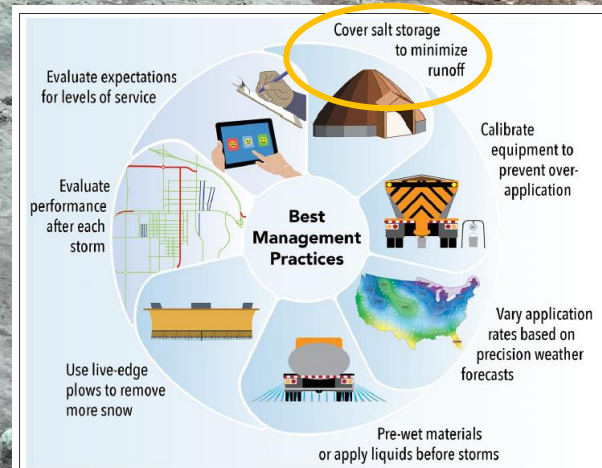
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Distribution score

Boost unavailable



# Don't be like Bob

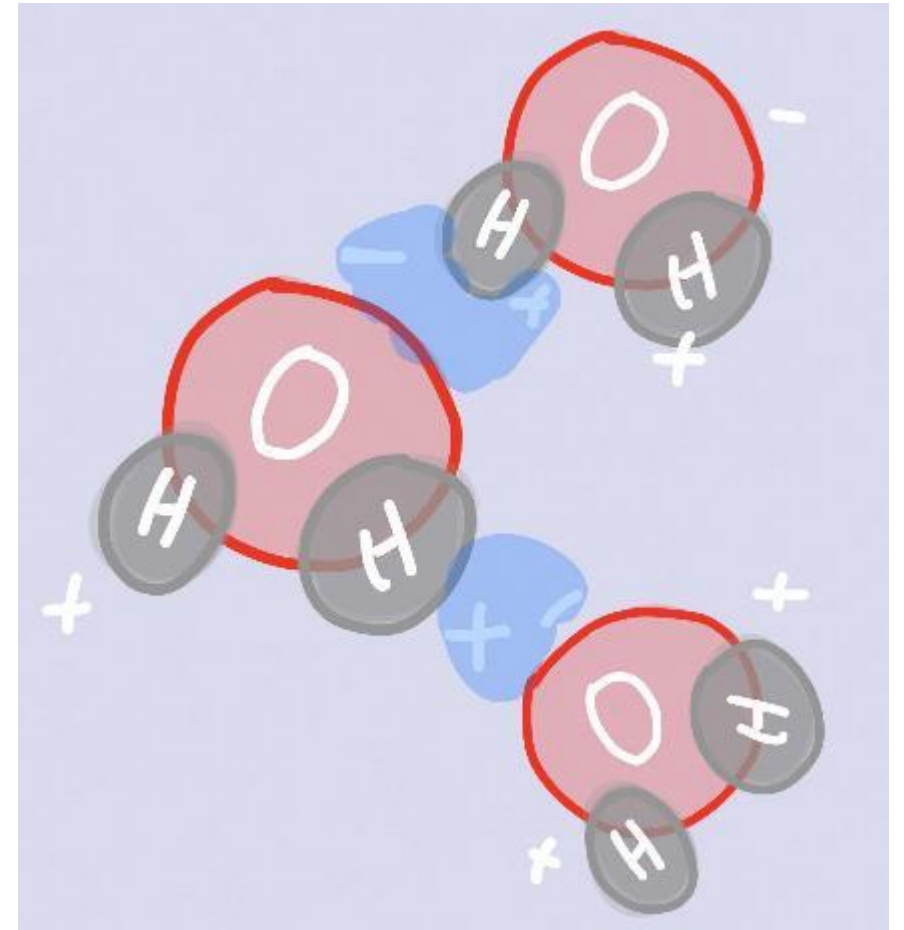
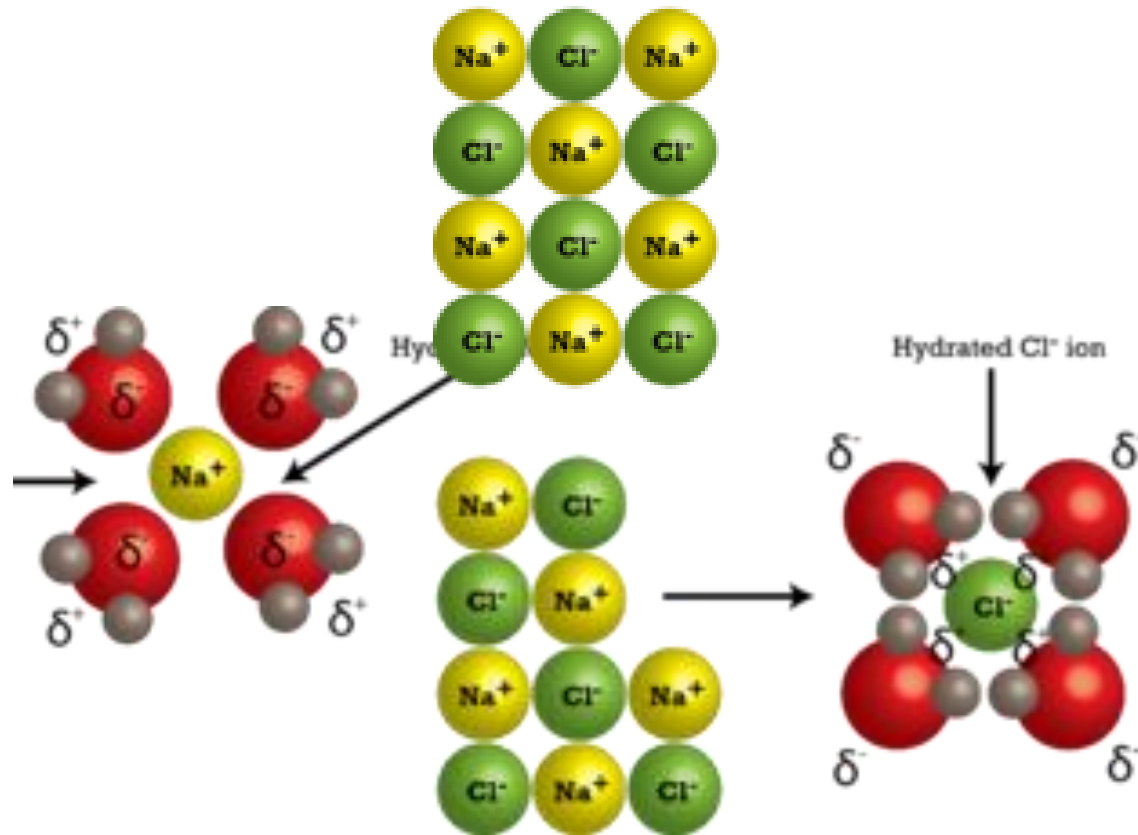


The background of the image is a dense field of small, translucent blue ice crystals. These crystals vary in size and shape, some appearing as simple rounded grains while others have more complex, angular forms. The overall effect is a textured, crystalline surface with a consistent light blue color palette.

# Deicers 101

# Salt

NaCl = Sodium Chloride





# Ice Melt Capacity

**A fixed amount of product:**

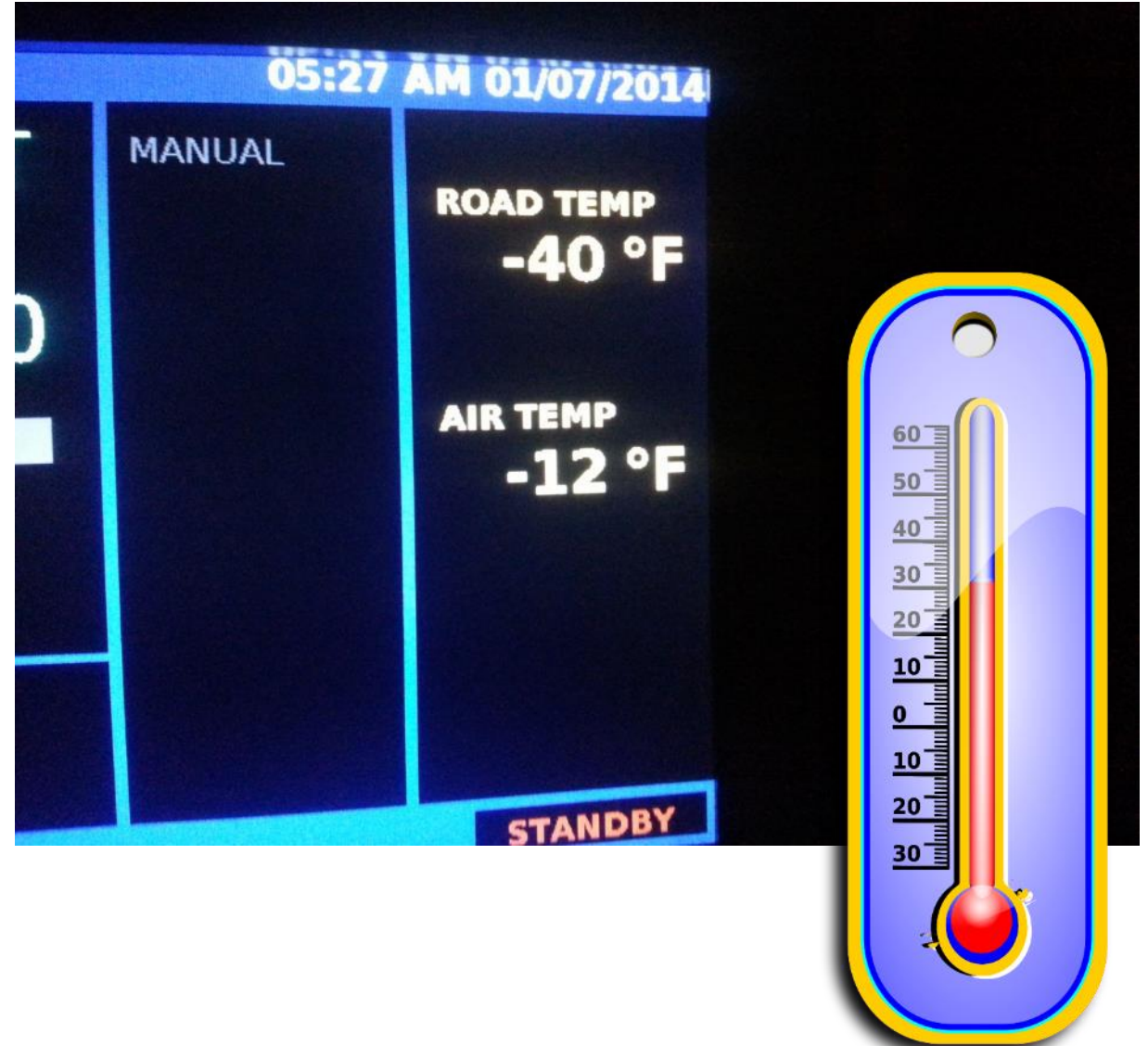
Will always melt the same amount of snow/ice



# How Deicers Work

## All deicers work:

- Faster at warmer temperatures
- Slower at colder temperatures
- **PAVEMENT temp** determines speed



## Deicing Application Rate Guidelines for Parking Lots, Sidewalks and Trails

For best results remove as much snow and ice as possible before applying deicers

Application Rate in lbs/per 1000 square foot area  
Wet at 6 to 12 gallons per ton      Apply with calibrated equipment

Pavement Temp. (°F)	Rock Salt *	
28 ° to 32 °		
23 ° to 28 °		
15 ° to 23 °		
0 ° to 15 °		
-5° to 0°		
< -5°		
SPEED of melting		

Rock salt (sodium chloride) is  
5-20F.

What do we expect and why?

But even before that . . .

How use  
?

\* Dry rock salt is not recommended. It is slow to melt and leads to over-application.  
 \*\*Winter sand contains ≤ 5% salt. It will not melt snow or ice.  
 For subsequent passes use ½ rate to the full initial rate.

## Deicing Application Rate Guidelines for Parking Lots, Sidewalks and Trails

For best results remove as much snow and ice as possible before applying deicers

Pavement Temp. (°F)	Application Rate in lbs/per 1000 square foot area					
	Wet at 6 to 12 gallons per ton			Apply with calibrated equipment		
	Rock Salt *	Bagged Blend Mostly Sodium Chloride	Bagged MgCl <sub>2</sub> or CaCl <sub>2</sub>	Rock Salt wet with Salt Brine	Rock Salt wet with other liquids	Winter Sand **
28 ° to 32 °	2.3	2.3		1.6		
23 ° to 28 °	2.3-4.5	2.3-4.5		1.6-3.2		
15 ° to 23 °	2.3-6.8	2.3-6.8		1.6-4.8		
0 ° to 15 °			2.3-6.8	3.2-4.8	3.2-4.8	Spot treat as needed
-5° to 0°			6.8		4.8	
< -5°	Plow Only					
<b>SPEED of melting</b>	<b>AVERAGE</b> The colder it is the slower it works	<b>Faster than rock salt</b> if the gradation is finer	<b>ABOVE AVERAGE</b>	<b>FAST</b>	<b>FAST</b>	<b>NONE</b>

What's going on here?

\* Dry rock salt is not recommended. It is slow to melt and leads to over-application.

\*\*Winter sand contains ≤ 5% salt. It will not melt snow or ice.

For subsequent passes use ½ rate to the full initial rate.



Big Idea: Liquids are Rockstars!

# Chemical Deicing Strategies

When using liquids, melting begins immediately.

Dry salt



Pre-wet salt  
Pre-treated materials



Liquid Only



Basic

Slow but powerful

Advanced

Faster and as powerful as dry products

Future

Fastest, less powerful, requires more experience



# Anti-icing Equipment



## Deicing Application Rate Guidelines for Parking Lots, Sidewalks and Trails

For best results remove as much snow and ice as possible before applying deicers

Pavement Temp. (°F)	Application Rate in lbs/per 1000 square foot area Wet at 6 to 12 gallons per ton <span style="border: 1px solid orange; border-radius: 50%; padding: 2px;">Apply with calibrated equipment</span>					
	Rock Salt *	Bagged Blend Mostly Sodium Chloride	Bagged MgCl <sub>2</sub> or CaCl <sub>2</sub>	Rock Salt wet with Salt Brine	Rock Salt wet with other liquids	Winter Sand **
28 ° to 32 °	2.3	2.3		1.6		
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0 ° to 15 °			2.3-6.8	3.2-4.8	3.2-4.8	Spot treat as needed
-5° to 0°			6.8		4.8	
< -5°	<b>Plow Only</b>					
<b>SPEED of melting</b>	AVERAGE The colder it is the slower it works	Faster than rock salt if the gradation is finer	ABOVE AVERAGE	FAST	FAST	NONE

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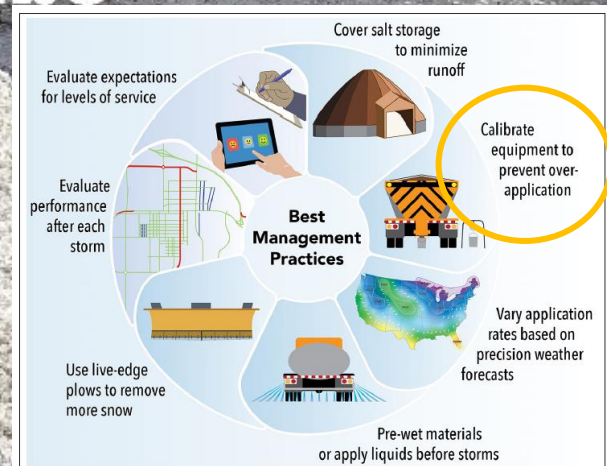
Cudahy

69.9% reduction in salt through training, equipment **calibration**, and incorporation of brine for anti-icing.

**Total savings in 2020 = \$97,000**

**After Calibration  
300lbs**

**Before  
Calibration  
850lbs**





Be  
**Salt**  
**Wise!**

# Drop Spreader Calibration



Watch later



Share

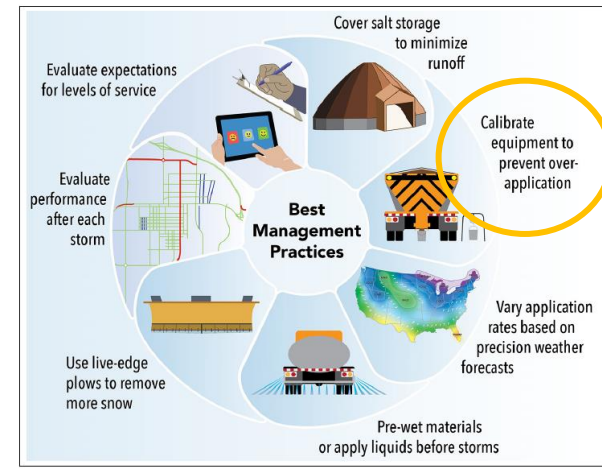


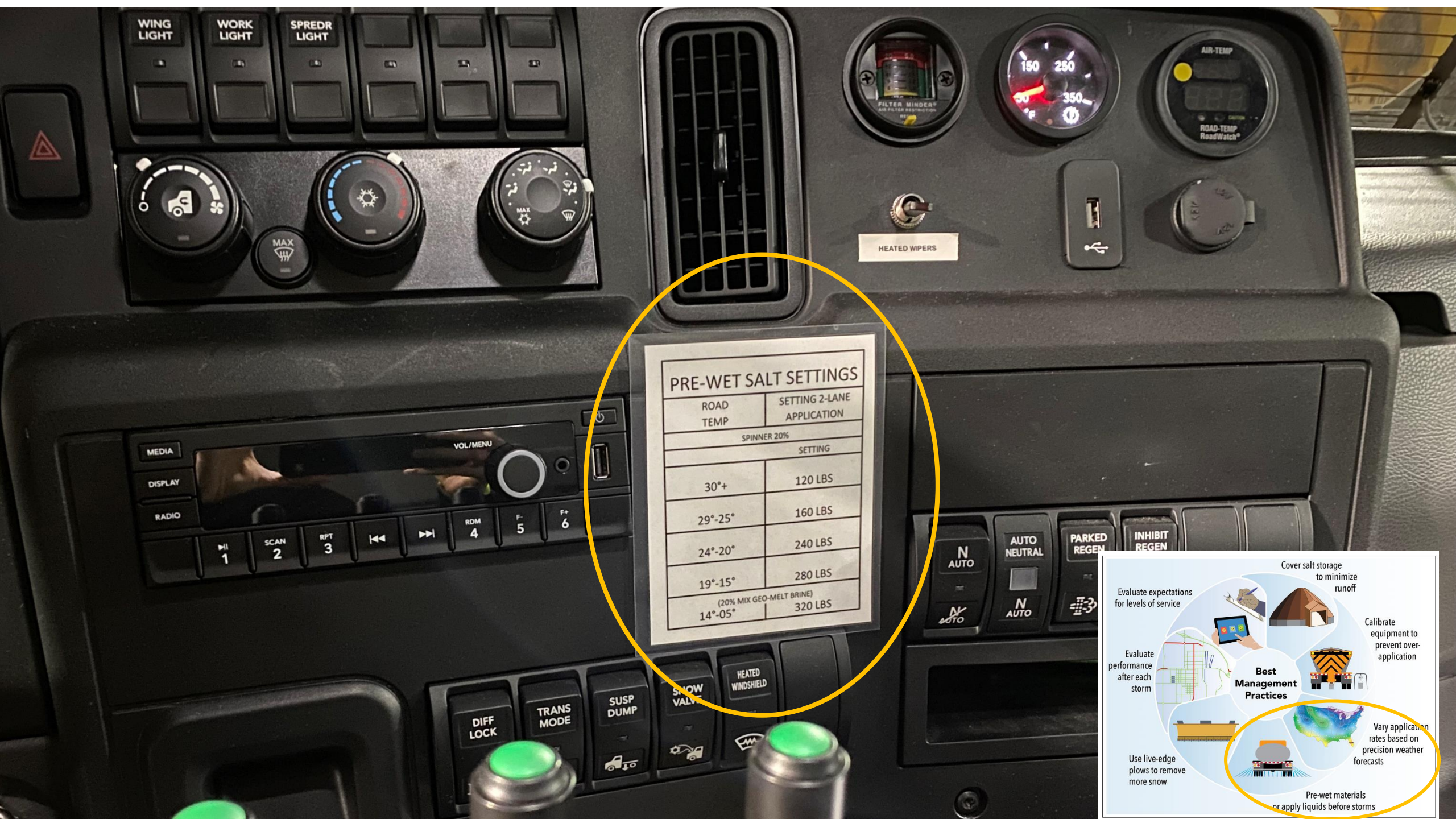
Watch on  YouTube

# Calibration-made-easy when hand spreading



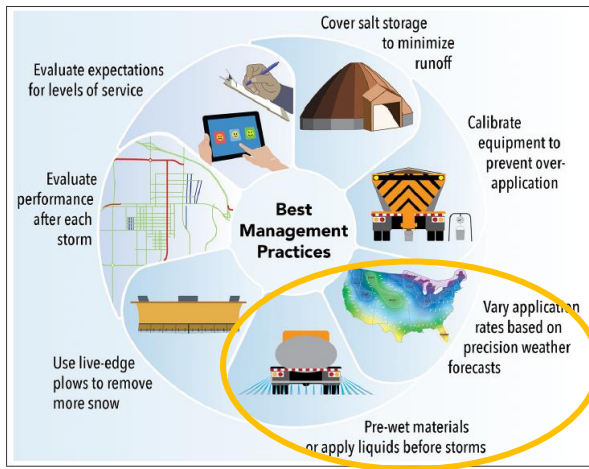
Liquid  
equipment  
needs to get  
calibrated,  
too.





### PRE-WET SALT SETTINGS

ROAD TEMP	SETTING 2-LANE APPLICATION
SPINNER 20%	
SETTING	
30°+	120 LBS
29°-25°	160 LBS
24°-20°	240 LBS
19°-15°	280 LBS
(20% MIX GEO-MELT BRINE)	
14°-05°	320 LBS



# Encourage Innovation: Closing the loop with waste stream products

Pickle juice

Cheese brine

Soy sauce

Water softening discharge



Apex = Calcium Chloride  
**Reindl**  
Chloride = bad  
Chloride most common ingredient in "Salts"  
230 mg/l or less per 5gal water is the standard  
Calibrate Salters (computer controlled salters) MDSS  
No rock salt below 15°F  
Salt brike 2388 optimal  
Better for environment  
works faster, stays put  
32 gal/ton or 100 gal/ton  
200 gal per hopper 30 gal per hopper  
15°F  
50 lbs - 10,000 Gal water  
WI Saltwise.com  
Clear Roads +09







WARNING

**BADGER**  
Omaha Standard

STATE OWNED  
**18193**  
WISCONSIN

# Smart Salting Workshops



2023-2021  
- Fueling Pilot  
- Johnson and Wood  
- Debris  
- Maintenance Office  
- Wisconsin State Highway Flood Resilient Information System  
- Recommendations  
- How to use smart salting equipment  
- How to use smart salting equipment  
- How to use smart salting equipment  
- How to use smart salting equipment  
- How to use smart salting equipment  
- How to use smart salting equipment

Slide from: Andrea Bill - UW Madison

# Equipment Open Houses



# Wednesday Webinars



Legal and Policy Strategies for Chloride Management  
260 views • Streamed 2 months ago



Salt Wise Stories: City of Eau Claire  
337 views • Streamed 3 months ago



Brine Blends  
205 views • Streamed 5 months ago



Direct Liquid Application  
292 views • Streamed 6 months ago

**Wednesday**  
**SALT WISE**  
**Webinars**

presenter:  
**Matt Donovan,**  
**Mayo Clinic**

**Mayo Clinic says,**  
**"Hold the Salt"**  
**Sept 1 | 12:00 pm**

First Wednesday Livestreams  
wisaltwise.com

- March 1 – Granular and Liquid Deicer Calibration
- April 5 – Green SnowPro: Liability Protection in NH
- May 10 – Smart Salting: Reviewing the Basics



Ice Melting Application for Parking Lots  
Use as much salt as possible

Application	Rate (lb/1000 sq ft)
Bagged Blend, Mostly Sodium Chloride	2.3
	2.3-4.5
	2.3-6.8

Faster than...  
... salt...  
... radiation...  
... liner

# Wisconsin Salt Wise

Once you put salt down, it doesn't go away!

All of the winter salt that we apply ends up in our soil or local waterways. Once salt is in our waterways, it's here to stay.

Chloride from salt is toxic to aquatic life.

Salt infiltration has also been observed in local drinking water wells.

It only takes 1 teaspoon of salt to pollute 5 gallons of water



WI Salt Wise @WISaltWise · Jan 25  
 #saltwiseshoutout to @HoChunkMadison. They cut winter salt use by 70% through incorporation of brine for anti-icing (#lovethelines) and a focus on mechanical removal. Way to track salt use and be leaders in the work to #keepfreshwaterfresh! @HoChunkNationPR



8 27

What product are you applying?



# Salt Wise Next Steps

- **Train maintenance staff**
  - Virtual and in-person Smart Salting trainings
  - Salt Wise Wednesday Webinars – on YouTube
  - Calibration resources and training materials available on the website
- **Educate students and staff**
  - WI Salt Awareness Week
  - Social Media
- **Collaborate!**
  - Promote and share a Salt Wise message
  - Wisconsin legislation: LRB 1077-2
  - How else can we help you to be Salt Wise?

**Wisconsin Salt Wise**

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All of the winter salt that we apply ends up in our soil or local waterways. Once salt is in our waterways, it's here to stay.

Chloride from salt is toxic to aquatic life.

Salt infiltration has also been observed in local drinking water wells.

It only takes **1 teaspoon of salt** to pollute **5 gallons of water**

The infographic features a blue water drop icon, a silhouette of the Wisconsin state capitol building, and a cross-section of the ground showing salt infiltrating into a water table. It includes icons of a fish and a water well.

**Safe Sidewalks and Clean Water**

First, remove as much snow and ice as you can before applying salt. If extra salt remains after pavement is clear, please **sweep it up** to protect our lakes, streams and drinking water.

Hire out your winter maintenance? Ask them to get "Salt Wise Certified!"

PROUD TO BE SALT WISE

Learn more at:  
[f](#) [v](#) [t](#)  
[www.wisaltwise.com](http://www.wisaltwise.com)

The advertisement shows a woman in a purple jacket and yellow gloves sweeping snow from a sidewalk. A circular logo with a snowflake and the text 'PROUD TO BE SALT WISE' is overlaid on the image.



Thank you!

Allison Madison

[wisaltwise@gmail.com](mailto:wisaltwise@gmail.com)



# WI Groundwater Hardness, Water Softeners, and Chloride Variance - Connecting the Dots

WWTPs with Cl variances



TotalGroundwaterHardnessWI



AVERAGE

