

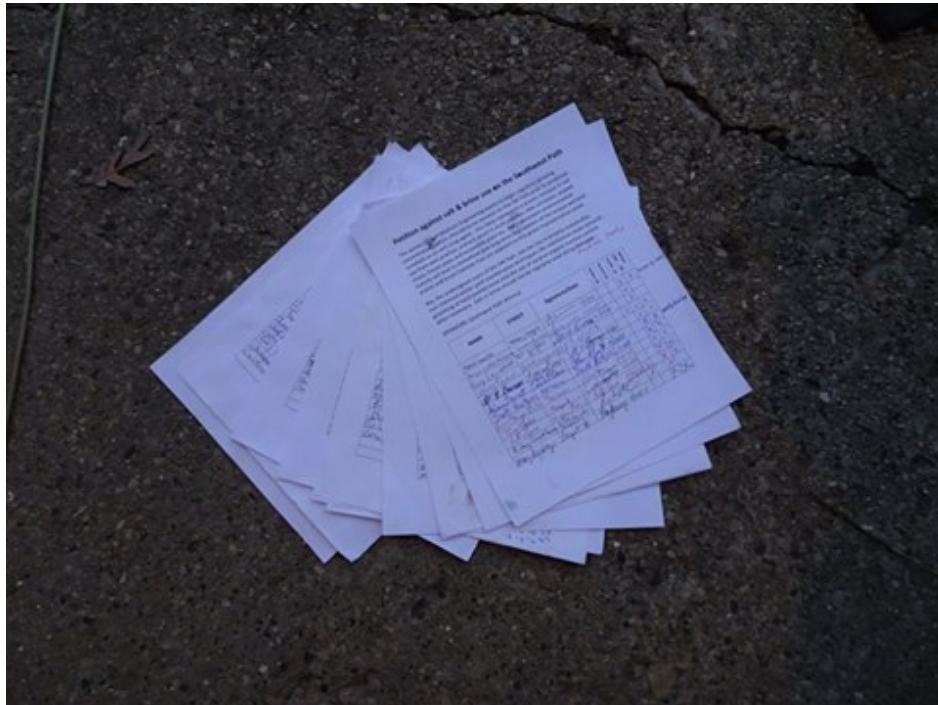
Why salt spray is wrong for bike-pedestrian paths

February, 2016
Southwest Path Alliance
Madison, WI



Salt Spraying Not Needed or Wanted by Path Users

- SW Path was [originally designated](#) “No salt” in 1999 to protect plants and L. Wingra. Final report of community-based design committee included this:
 - “ (8) With regard to winter maintenance, the city should look for a solution that accommodates both bikers and skiers. No salt should be used for winter maintenance. Salt will be incompatible with native plantings, will wash into abutting gardens, and will contribute to lake pollution.”
- SW path was maintained with a brush and NO SALT for first 10 years
- Engineering began “bare pavement” plowing attempts and rock salt starting about winter 2010-11
- Salt spray “pilot study” initiated in 2015-16 with no input from path users, neighborhood groups or alders;
- [Recent Petition with 120 signatures](#) of path users to stop using salt and brine on Madison paths



Petition against salt & brine use on the Southwest Path

This winter, City of Madison Engineering wants to begin regularly spraying concentrated sodium chloride brine solution on the SW Path prior to predicted snowfalls as an anti-icing agent. This likely represents a drastic increase in salt use from past practice, and will result in slush creation, bike corrosion, soaked shoes, frozen paws and occasional glare ice. Salt's persistent environmental toxicity will lead to immediate and long-term degradation of the unique wetland, prairie and forest habitats that are adjacent to this green transportation asset.

We, the undersigned users of the SW Path, ask the city to employ sustainable, non-chemical winter path maintenance techniques like mechanical snow removal, grooming of hard-packed snow and the use of sand or organic traction control when necessary. Salt or brine should not be regularly used along this path.

SPONSOR: Southwest Path Alliance

NAME	STREET	Signature/Date	Winter (1)	Winter (2)	Winter (3)	Winter (4)
Jon Cameron	502 Williamsburg Way Ct	Jon Cam 11/19/15			X	X
Andrew Leaf	2007 Jenifer	Andrew Leaf 11/19/15		X	X	X
Doug Kim	1602 Wilbur	Doug Kim 11/20/15			X	X
Caumont Hall	530 W. Main	Caumont Hall 11/21	X	X	X	X
Daniel Dryden	229 W. Main	Daniel Dryden 11/21/15			X	X
Bob Taylor	3205 Cascade	Bob Taylor 11/22/15	X	X	X	X
Christine Sell	415 Williamsburg	Christine Sell 11/22/15	X	X	X	X
Christopher Berge	811 Jenifer	Christopher Berge 11/22/15			X	X
John Massey	1208 E. Dayton	John Massey 11/22/15		X	X	X
Daniel Jackson	4905 Hayes Ave	Daniel Jackson 11/22/15		X	X	X
Pickiness	2416 Gallagher	Pickiness 11/22/15	X	X	X	X
Alison Dwyer	2536 Superior St	Alison Dwyer 11/22/15	X	X	X	X

Summary of salt brine spraying on shared-use paths

2015 “Pilot Program” on Southwest Path was initiated with ZERO neighborhood or path user input

- Ineffective, promotes formation of dangerous **glare ice** on path
- **Kills plants** and trees, permanent dead grass zones
- Immediately **corrosive** to bikes on contact with slush
- Uses **5X the concentration** of industrial corrosion tests
- Irritates and **injures dog paws**
- Acute **toxicity** of meltwater during spring thaws
- Salt is a persistent and cumulative **poison in soils**, wetlands and lakes
- 1 Tsp of salt **permanently pollutes** 5 gallons of water (*src: WI Saltwise*)
- 400 lb of salt is dispensed in each SW path brine “treatment”; that means about **160,000 gallons** of water will be permanently and **unnecessarily polluted** by City Engineering every time it snows.

Salt brine is unacceptable on our bike-ped paths

... Even if it somehow improved safety, which it does not.



Salt coating from brine slush on SW Path during 2015-16 "pilot program"



Decontamination is required after dogs are walked on brine-treated path

How brine pre-treatments cause **glare ice** on paths

bike-pedestrian paths need different snow maintenance than streets!

- 1) Concentrated salt brine is sprayed on path prior to snowfall
 - 2) Snow falls on path and melts on contact with brine
 - 3) Slush layer forms and is continually diluted by falling snow
 - 4) No car traffic is present to remove the slush and heat pavement
 - 5) **Salinity of slush layer is diluted by falling snow until it freezes into solid ice at whatever temperature the pavement happens to be**
- *Temperature fluctuations around solution's freezing point will always tend to recruit more snow into solid ice !*

Glare ice from salt-brine pre-treatment- Dec 2015

*Salt brine sprayed on 12/28 from Commonwealth to Beltline prior to 5" of wet snow
Created **unprecedented** glare-ice **for over a week** throughout treated area.*



Dec 30- Frozen slush in brine-treated area



Dec 31- Treacherous glare ice on entire brine-treated span

Brine treated vs. untreated sections after one day:



Brine treated section:

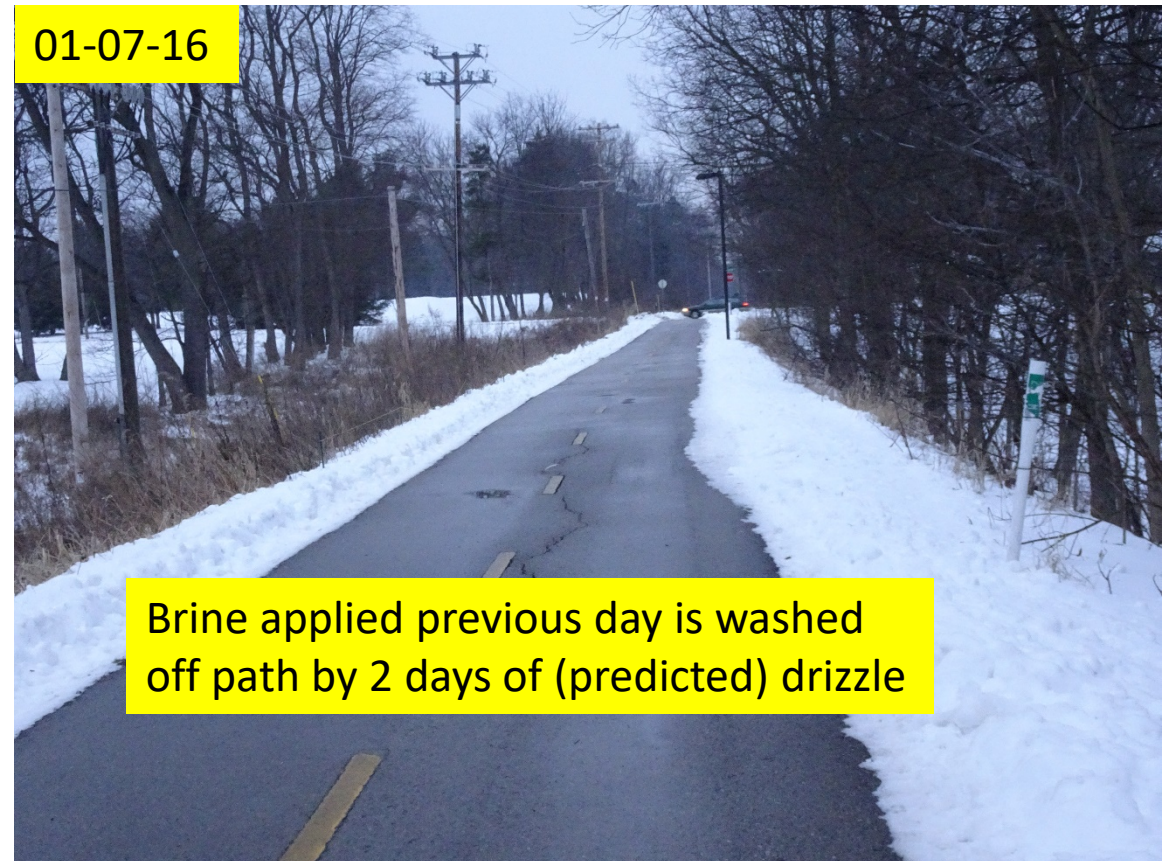
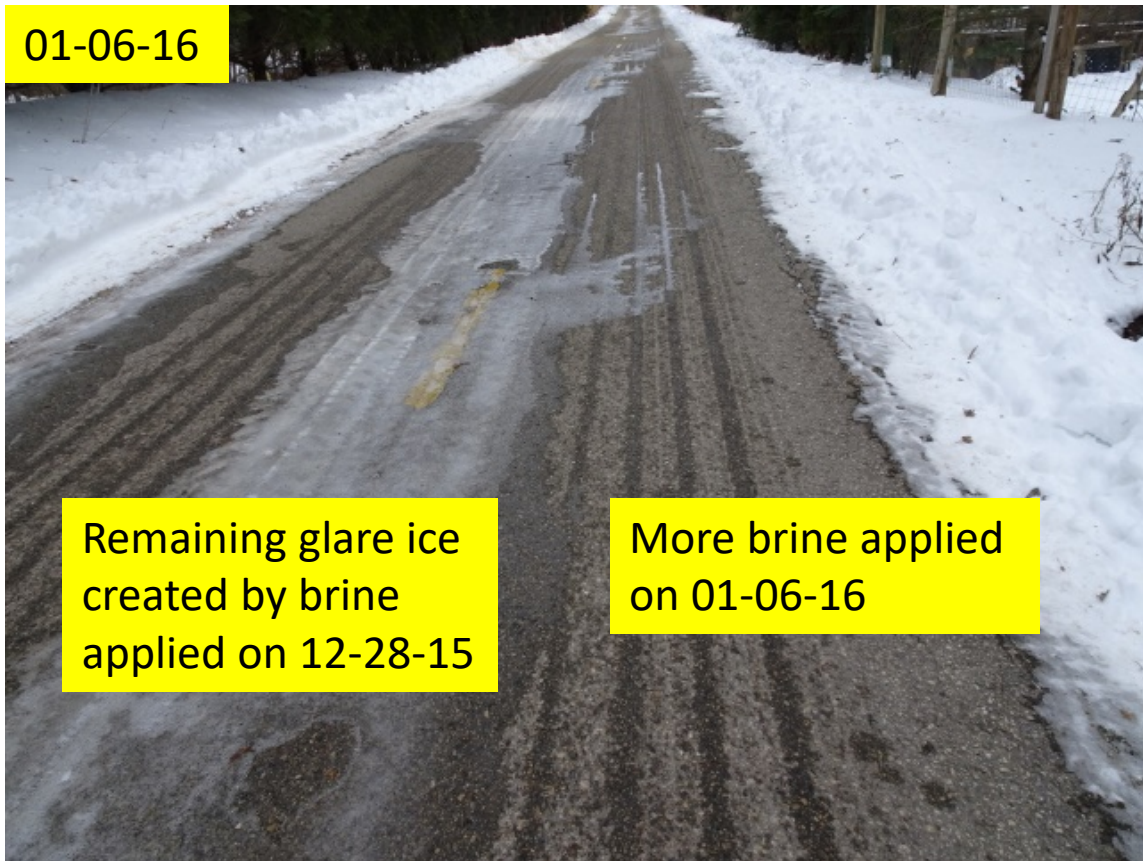
Barely passable with glare ice and corrosive slush



Untreated section:

Safe surface for walking, running biking

Brine use creates ice and poisons greenspace



Even if brine was somehow effective, its use in a greenspace is not justifiable when traction agents like course sand or organic matter can be used instead.

Results of salt brine spraying on SW Path in 2015-2016

Each brine application = approximately 400lb of unnecessary salt into Madison greenspaces and Lakes

Brine Applied	Conditions	Results
Dec 28, 2015	5" snow followed by cold temps	Unprecedented Glare Ice created along entire treated length. Ice patches remained until next thaw cycle.
Jan 6, 2016	Brine spraying was followed by two days of drizzle	Brine salt immediately washed into greenspace and Lake Wingra
Feb 1, 2016	Brine applied to above-freezing pavement-	Anti-icing measure unnecessary- Brine salt swept into greenspace with 1" of snow that wasn't sticking on any surfaces anywhere
Feb 5, 2016	Brine followed by temps in the 40s	Anti-icing measure unnecessary- Brine salt swept into greenspace with melting snow

New brush works great without using brine

Same location on path after brushing with **NO BRINE USED**

Excellent results achieved by “brush only” on 02-15-16, 03-01-16 and other dates.



Overplowing: Stripping top fluff converts ideal surface to “unsafe”

Photos taken 10 minutes apart; before and after a “scraping” plow pass

When base layer exists, grooming is preferable to trying to scrape down to pavement



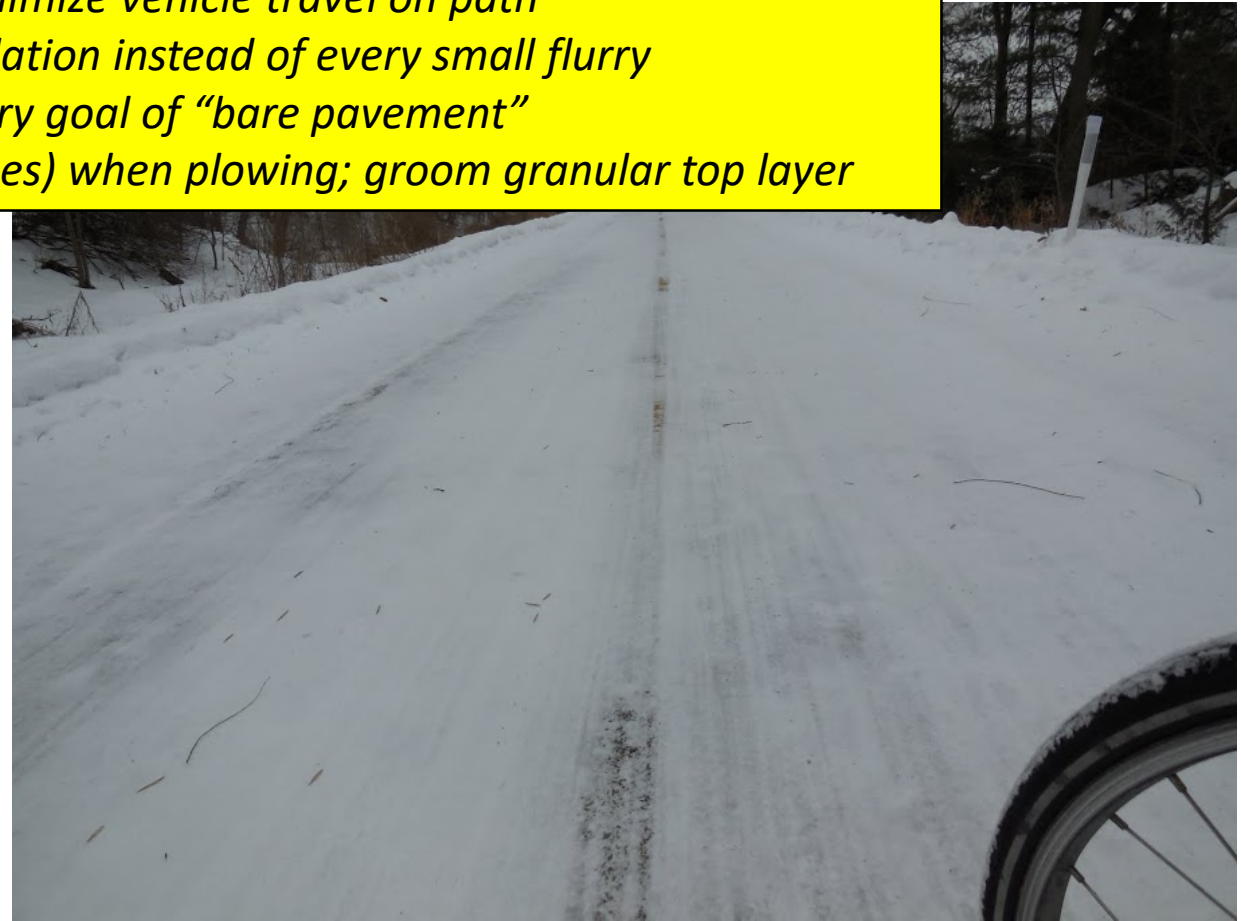
For light snow, just let it go!

Slip hazard created by over-plowing (Zamboni effect)

Bare pavement is never achieved scraping with plow anyways.

Suggestions for avoiding this regularly-occurring hazard:

- *Use brush for lighter snows and minimize vehicle travel on path*
- *Plow only after substantial accumulation instead of every small flurry*
- *Abandon unrealistic and unnecessary goal of “bare pavement”*
- *Raise blade off surface (set skid shoes) when plowing; groom granular top layer*



Slip hazard from flooding and re-freeze

- **Brine** will not prevent this!
- **Sand** can help after formation
- **Prevent** by removing slush during thaw cycles



Possible tweaks to EQUIPMENT

- Use rotary brush to clean to bare pavement when feasible
- Leave groomed surface behind whenever plowing is done
 - 1) Use skid shoes to raise blade $\sim \frac{1}{4}''$ - $\frac{1}{2}''$ to retain some fluff, and/or
 - 2) Try grooming granular surface layer with drag bar or chain loop



Suggested winter maintenance protocol

For shared-use paths in Madison (sustainable and user-friendly):

- **Abandon unnecessary & unrealistic goal of plowing to “bare pavement”**
 - Operational goal should instead be a “safe and uniform surface”
- Minimize vehicle passes to reduce snow compaction and ice formation
- Use rotary brush soon after light and moderate snowfalls
- When plowing heavy snow, use skid shoes to raise blade (e.g. 1/4”)
 - Follow with brush, or groom with loop of heavy chain dragged behind plow
- Remove any slush and water during thaw cycles
 - This is very important, but currently not part of protocol
- Use course sand (not fine street sand) for traction control as needed
- **Never use salt brine pre-treatments**

DNR-designated Wetlands along South West Path

From Wisconsin [Wetland Regulations](#): NR 103.03(2)(d):

“Concentrations or combinations of substances which are toxic or harmful to human, animal or plant life may not be present in amounts which individually or cumulatively may cause significant adverse impacts to wetlands.”



From Wisconsin Wetland's Association: [A Local Decision Maker's Guide to Wetlands](#):

“Wetland functions that develop under site-specific conditions over long periods of time can be difficult and very expensive to recreate elsewhere on the landscape.

For this reason, protecting the location of existing wetlands is the most effective way to preserve the public benefits wetlands already provide to your community. “

Prairie restorations are poisoned by salt brine



Unique woodland habitat is poisoned by salt brine



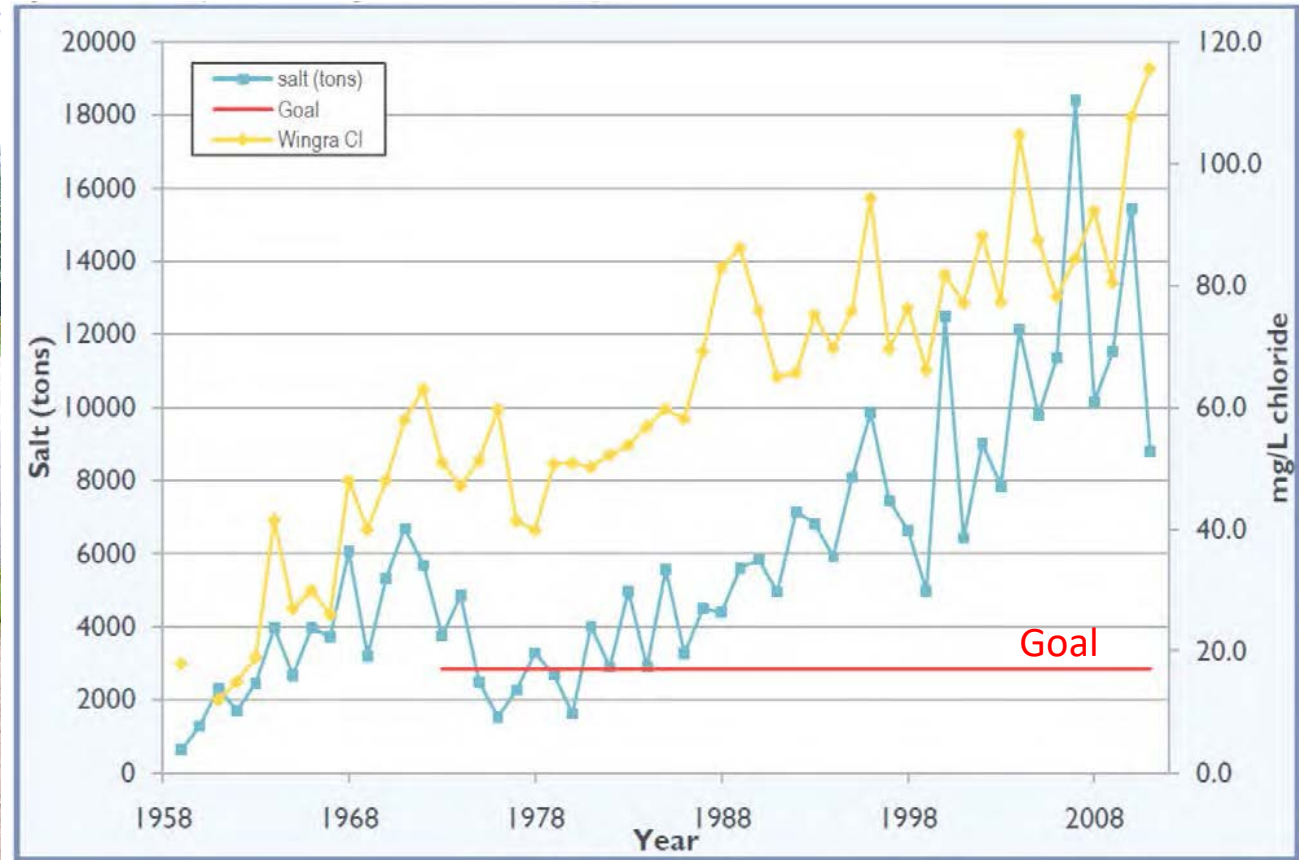
Thaws send salt brine plumes with acute toxicity into Wingra

Brine applications also contribute to near-toxic levels of cumulative chloride

One of the many drains which line the path
(These flow downhill directly into Lake Wingra)



Madison Salt Use Compared with Lake Wingra Chloride Levels
(from *City of Madison 2012 Salt Report*)



Background on salt brine anti-icing technique:

- Developed [for highways](#) as an anti-icing method to help prevent vehicle-compacted snow from adhering to pavement in below-freezing temperatures- uses highly concentrated (~23%) sodium chloride solution.
- Can reduce “time-to-bare-pavement” when applied to **highways** with high-speed *vehicular traffic*.
- **No evidence** brine pre-treatment reduces ice formation or adhesion on bike-ped paths (or even low-traffic side streets, for that matter).
- In contrast, brine spraying on the SW Path has been shown to **create long-lasting glare ice** when applied during sub-freezing temperatures.
- Brine use in *above*-freezing temperatures is basically just pollution
- Brine pre-treatments are not considered “best practice” for bike-pedestrian paths by any known state or municipality.

Share your concerns:

[Link to "Report a Problem" page](#)

engineering@cityofmadison.com

[SW Path Alliance](#)

LINKS:

- [SW Path Alliance](#)
- [DMNA Path History](#)
- [Friends of Lake Wingra](#)
- [WI Wetlands Association](#)
- [Bike Madison](#)
- [WI DNR](#)

Thanks for valuable input:

Staff at Budget Bike, Madison in Motion, and Machinery Row. Mark Barnes of Barnes, inc; John Mitmoen, Chief of Shorewood Public Works; Jim Haugen, Polar Operations Manager WIPAC; and dozens of individuals who provided input while on the path or via the SW Path Alliance FB page.

Unless otherwise noted, photos and illustrations by Perry Sandstrom, who is responsible for any errors and omissions: [perry.sandstrom\(at\)gmail.com](mailto:perry.sandstrom(at)gmail.com)

