Winter Maintenance on the Shared-Use Southwest Path

Possibilities for Improving Safety and Eliminating Salt & Brine Use

November , 2015

Compiled from the experiences of daily wintertime users of the Southwest Path

Southwest Path Alliance
Madison, WI

SW Path winter maintenance history

- **1999: Citizens and adjacent neighborhoods recommend "no salt" when path was built:**
  - From 1999 DMNA letter to Mayor (item #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".*
- **2001-2009: Rotary brush, plows and NO Salt or Brine used successfully for many years**
  - Side path for XC skiing available after heavy snowfalls
- **~2009: Trackless plows intended for bridges and ramps begin plowing main path**
  - Rock salt applied sparingly on ice patches from flooding
- **2010-2015: Frequent scraping attempting "bare pavement" result in ice patches**
  - Plows deployed frequently- "whenever a cat's paws would make a track"
- **2010-2015: Increased applications of rock salt draw complaints from path users**
  - Brine pooling and high localized salt concentrations
- **2014-15: Rock salt distributed along entire path at least once.**
- ***Regular brine applications on SW Path proposed as anti-icing test for 2015-16***
  - Alarming trend for a ***persistent cumulative poison***: "No Salt" to "Used Sparingly" to "Regularly Applied" (?!)
  - Regular distribution of salt by brush will result in long-term environmental degradation

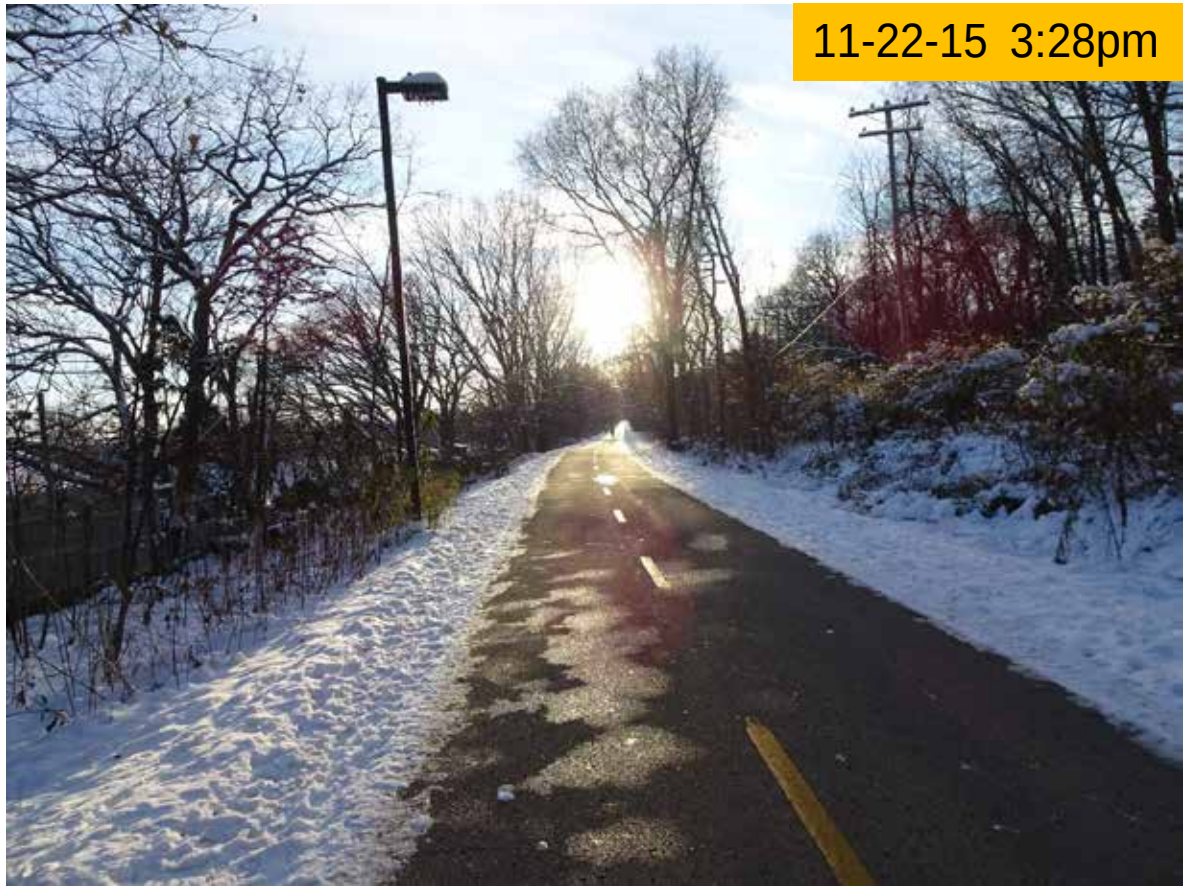
Brine anti-ice: street/highway vs. shared-use path

Curbs, Sidewalks, Built environment
50,000 vehicles/day,
Bikes, pedestrians (crossing), no animals

No Curbs, Side Foot Paths, Natural Environment
0-8 vehicles, day (maintenance vehicles only)
Bikes, pedestrians, pet dogs and wild creatures

Brine pre-treatment “experiment” of Nov. 2015

*Bare pavement **not** accelerated by brine pre-treatment*



Section of path with NO BRINE
(Clean pavement emerging)

Section of path with BRINE PRE-TREAT
(Corrosive residue emerging)

Bare Pavement via sublimation -No brine or salt

Plowing in **(3)** might have avoided ice in **(4,5)**, but still achieved bare pavement without using salt

5am **First snow of 2015**

6am **First plow-pass**

12pm **Wet snow left unplowed**

Saturday, Nov 21, 2015

8am **Re-frozen snow scraped**

4pm **People using still icy path**

8pm **Bare surface by sublimation**

Sunday, Nov 22, 2015

Main slip-hazards on SW Path

P=Prevent F=Fix NR= Not Recommended

	Compaction and scraping by plow (common @ cold Ts)	**Snow Melt flood-freeze (rare)**	**Freezing Rain & black Ice (rare)**
Best prevention:	Accumulation-based plowing with grooming	Plow or sweep during thaws	Groomed layer instead of bare pavement
Best Fix:	Traction Agent	Traction Agent	Traction Agent
Traction Agent	F	F	F
Rock Salt	F	F	P,F
Brine	NR	NR	NR

Compaction/smoothing by equipment (Zamboni effect)

Bare pavement is never achieved directly from plowing & scraping.
Accumulation-based protocol and grooming avoids this

Stripping top fluff turns ideal surface to “unsafe”

Photos taken 10 minutes apart; before and after a “scraping” plow pass
Grooming after scraping adds traction when a base layer exists

For light snow, just let it go!

Bare Pavement – No slip hazards

Created during cold mainly by:

- Plowing/brushing by equipment
- Sublimation by sun and wind

Scraped with snow + ice patches– slightly hazardous

Sublimates to bare pavement
In a day or two
without use of salt

Snowmelt/flooding and re-freeze - hazardous

- Brine will not prevent this
- Prevent by plowing in thaw

- Sand is possible fix
- Rock salt “fix” creates:
  - Slush
  - Slippery conditions
  - High salinity drainage

This spot is located above the tree shown in next slide:

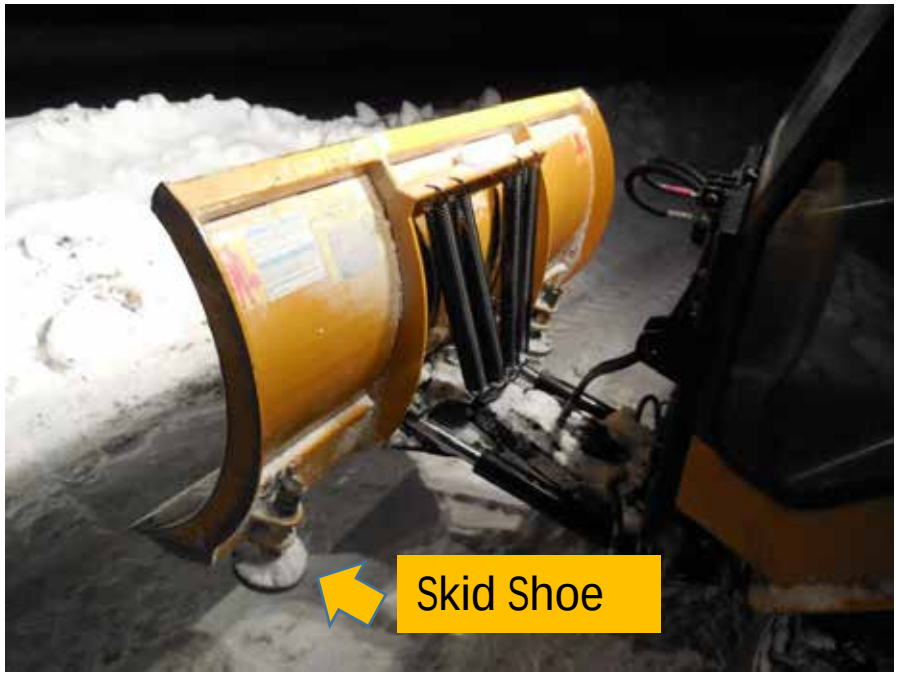
White oak that died in 2011-2012 season

- Healthy 150+ year tree died in a single season
- Possibly killed by salt poisoning

- Lowest spot on path for ~1/4 mile
- Ice Puddles here “fixed” with rock salt
- Brine tunnels observed through snow bank
- Brine observed pooled at base of tree

Possible modification to **EQUIPMENT**

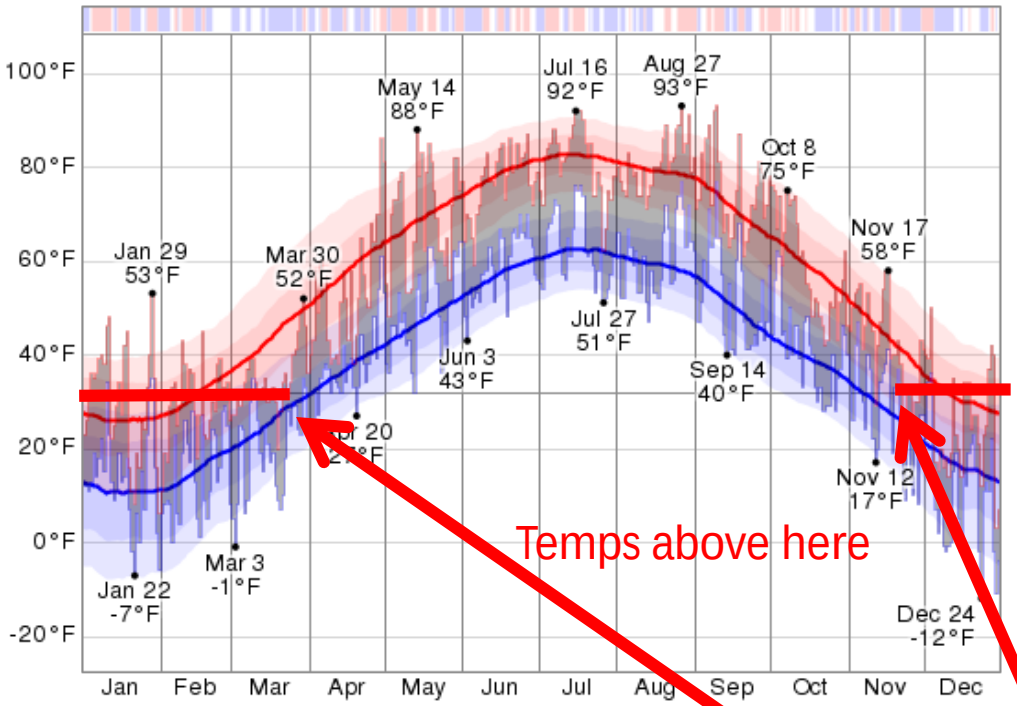
- Use rotary brush to clean to bare pavement when feasible
- Leave groomed surface behind whenever plowing/scraping is done
  - Use skid shoes to raise blade ~1/4 to retain some fluff, or
  - Try drag bar or chain loop behind plow; leaves light snow layer for traction



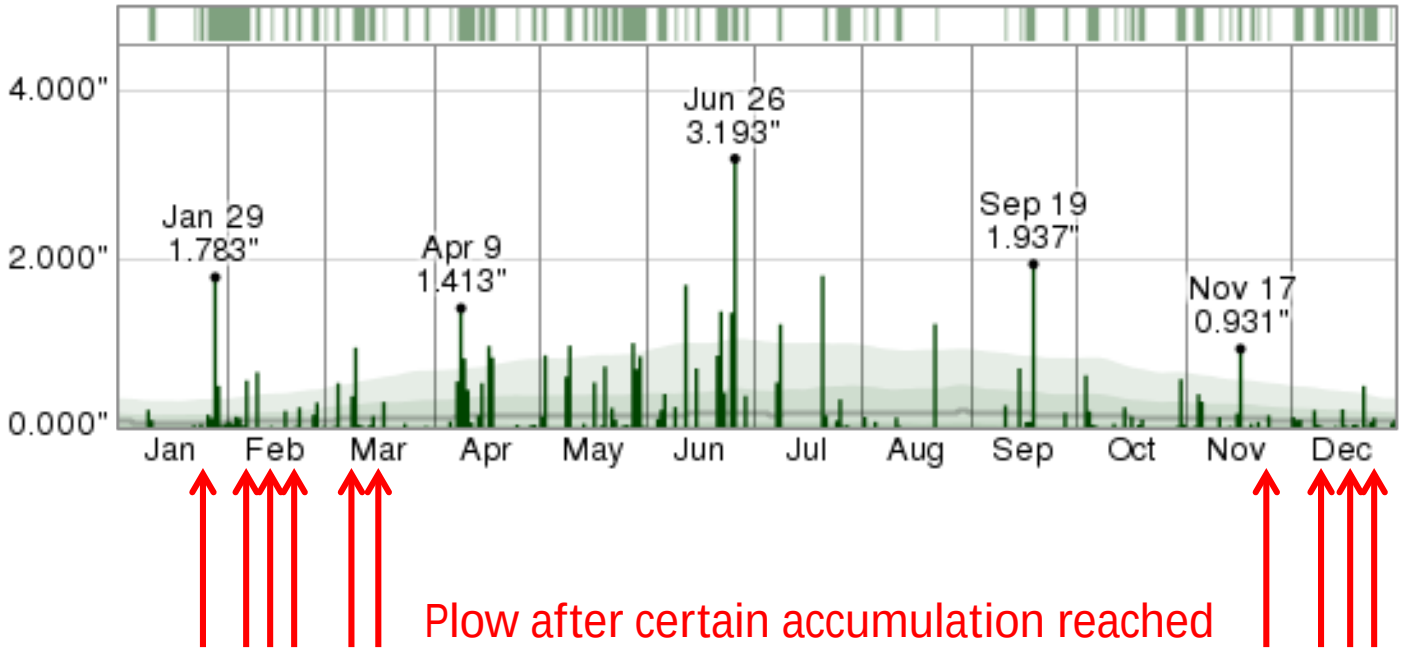
Possibility for Improved path plowing **PROTOCOL**

Example data from Madison 2013 weather

Temperature



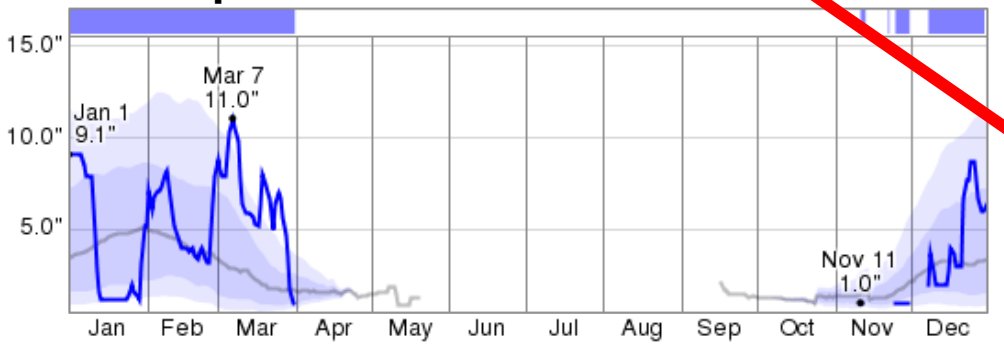
Precipitation Quantity



Temps above here

Plow after certain accumulation reached

Snow Depth



1) Plow when accumulation reached (e.g. 1”)

Instead of after ***every*** precipitation.

2) Plow or brush during extended thaws

Possible Modification to path maintenance **POLICY:**

- Present Policy (*superficial criteria; ignores shared use*):

  “Arterial bike paths are plowed as needed after any snow event. When a general plowing is underway the arterial paths will be plowed. The goal is to have these paths clear for commuters as soon as practical on weekdays”.

- Suggested Policy (*Safety-oriented; reflects shared use*):

  “Arterial bike-pedestrian paths are brushed or plowed as needed after significant snow accumulations and during thaw cycles. During snow emergencies, a path will be created as soon as possible through bulk snow. The goal is to leave a uniform, non-icy surface on non-motorized paths to safely accommodate cyclists, runners and pedestrians.”

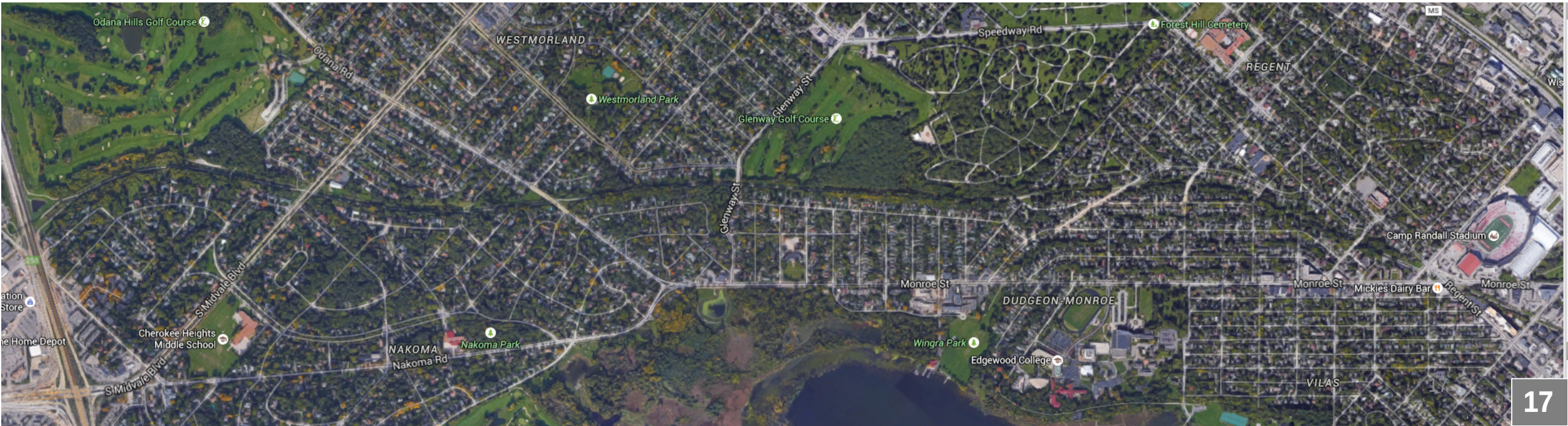
Winter maintenance for shared-use path:

Requirements differ from motorized streets and highways!

- Goal: reduce slip hazards & increase utility for all user types
- Surface: *texture* is more important than *appearance*
- Ice: prevented, removed, or made safe for walking, running, biking
- Snow: Removal by plow or brush, thin snow layers acceptable
- Traction agents have longer lifetimes than on a street – investigate organics?
- Avoid industrial-scale distribution of corrosive poison in greenways

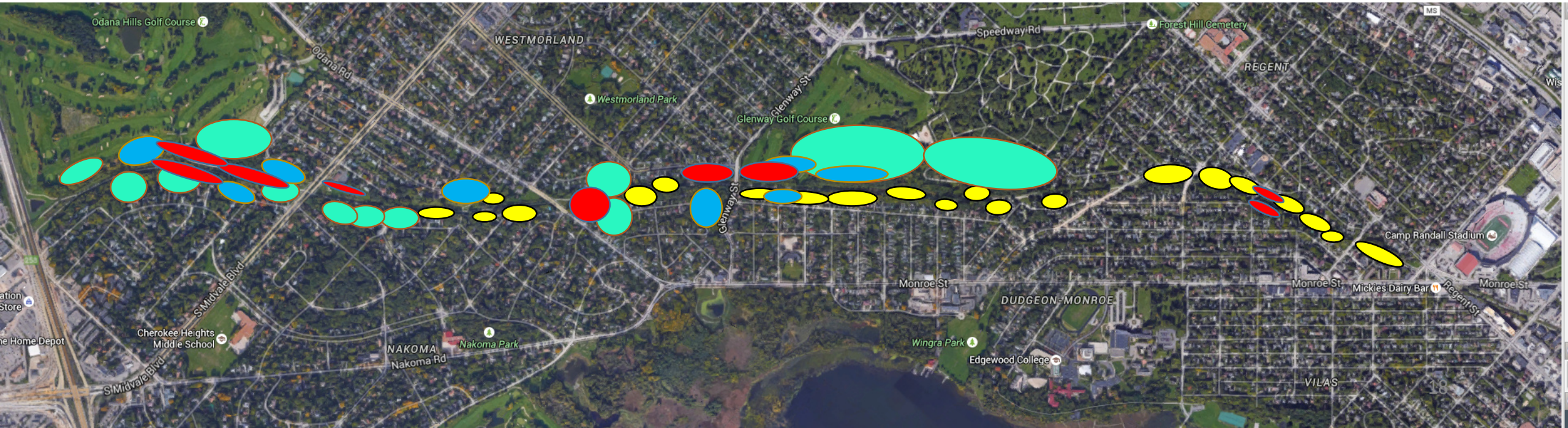
SW Path- A Linear Ecological Time Capsule

- Preserved from farming & development by terrain, then by rail line in 1889
- Landscape sacred to ancient hunter-gatherers for millennia
- Features many habitat community remnants from pre-settlement times
- Madison's nicest bike-pedestrian path and longest contiguous greenspace
- Comprised of landscape that has been ***historically free*** of salt and pesticides.



Existing habitat types adjacent to path

- Oak closed canopy forest or oak savannah remnant
- Mature hardwood forest /white pine stands
- Tall-grass and mesic prairie restorations
- Tended flower or vegetable gardens



Prairie Restorations

Glenway

Prospect

Odana

Prairie Restorations are directly impacted by salt

Unique Woodland Habitat

Unique Woodland Habitat

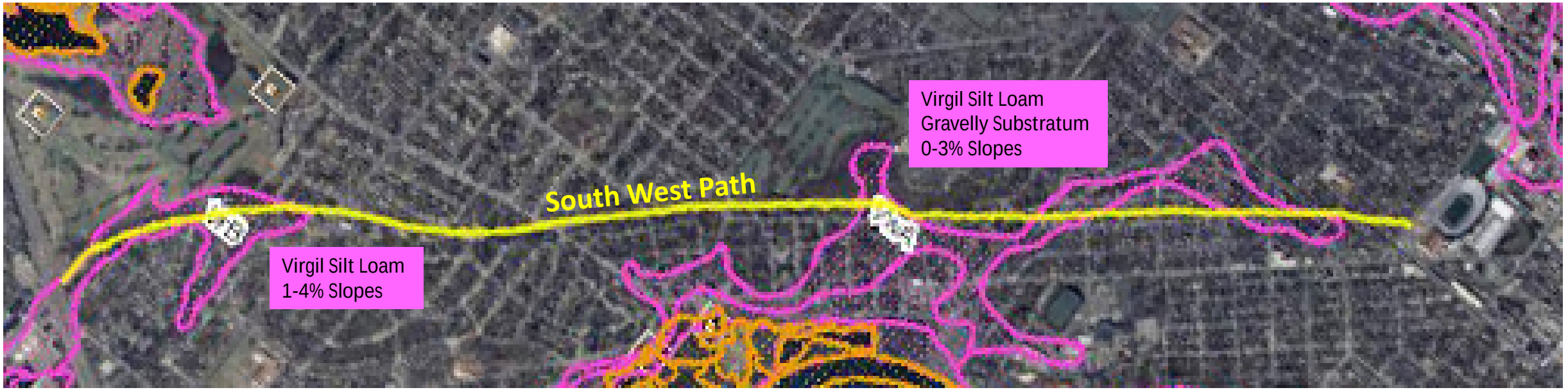
Flower and Vegetable Gardens

Wetland habitat mosaic poisoned by SW Path salt

- Perpendicular gulleys established after last ice age →
- Parallel drainage swales established in 1880's —
- Seasonal and permanent wetlands (W), vernal pools (V), streams (S)
- Supports wetland plant communities, nematodes, insects, frogs, salamanders, migratory birds, mink, raptors, canids, etc.
- Man-made and natural underground water paths exist but not illustrated

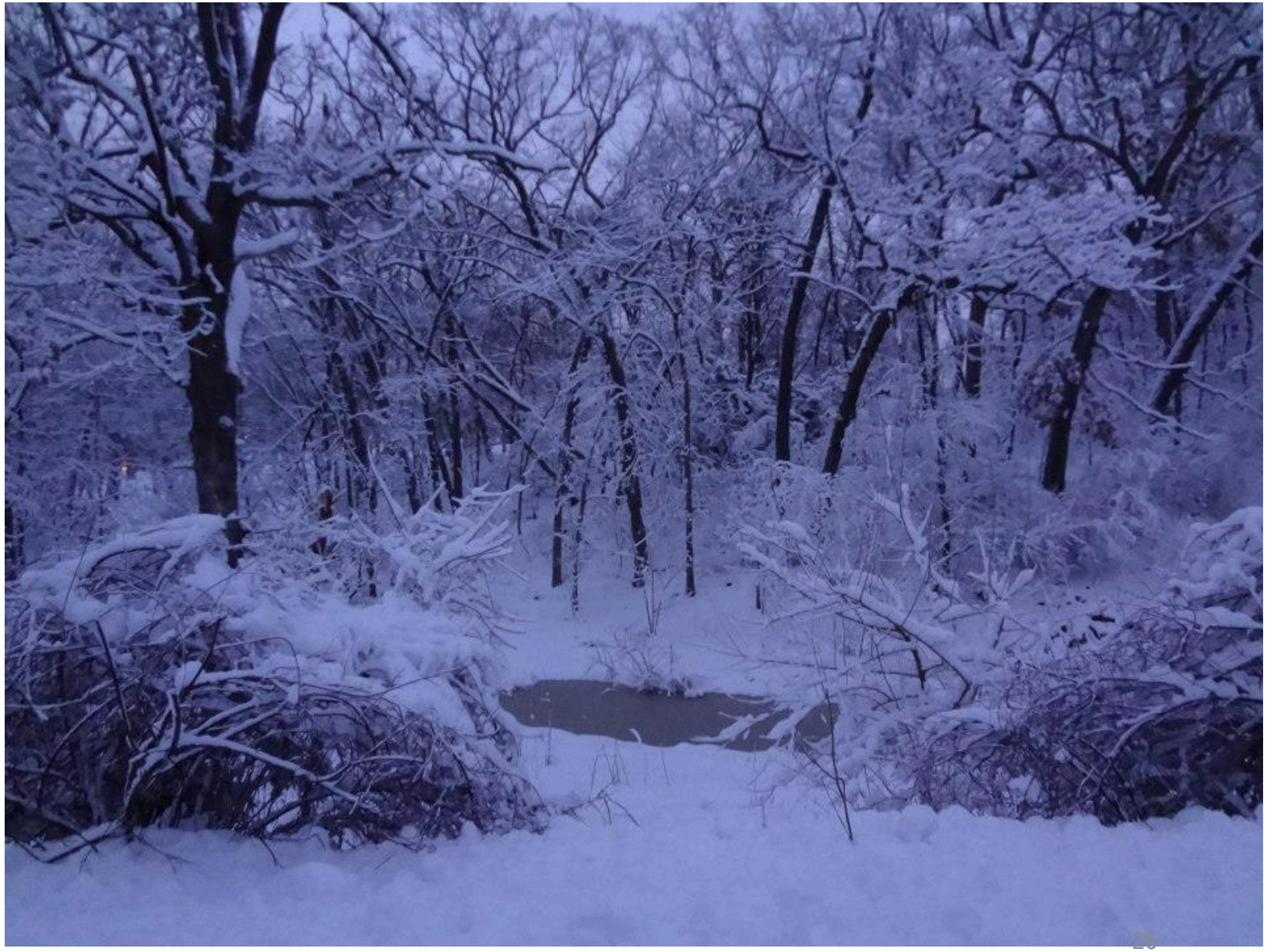
DNR-designated Wetlands along South West Path

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. "

Wetland Habitats directly adjacent to SW Path

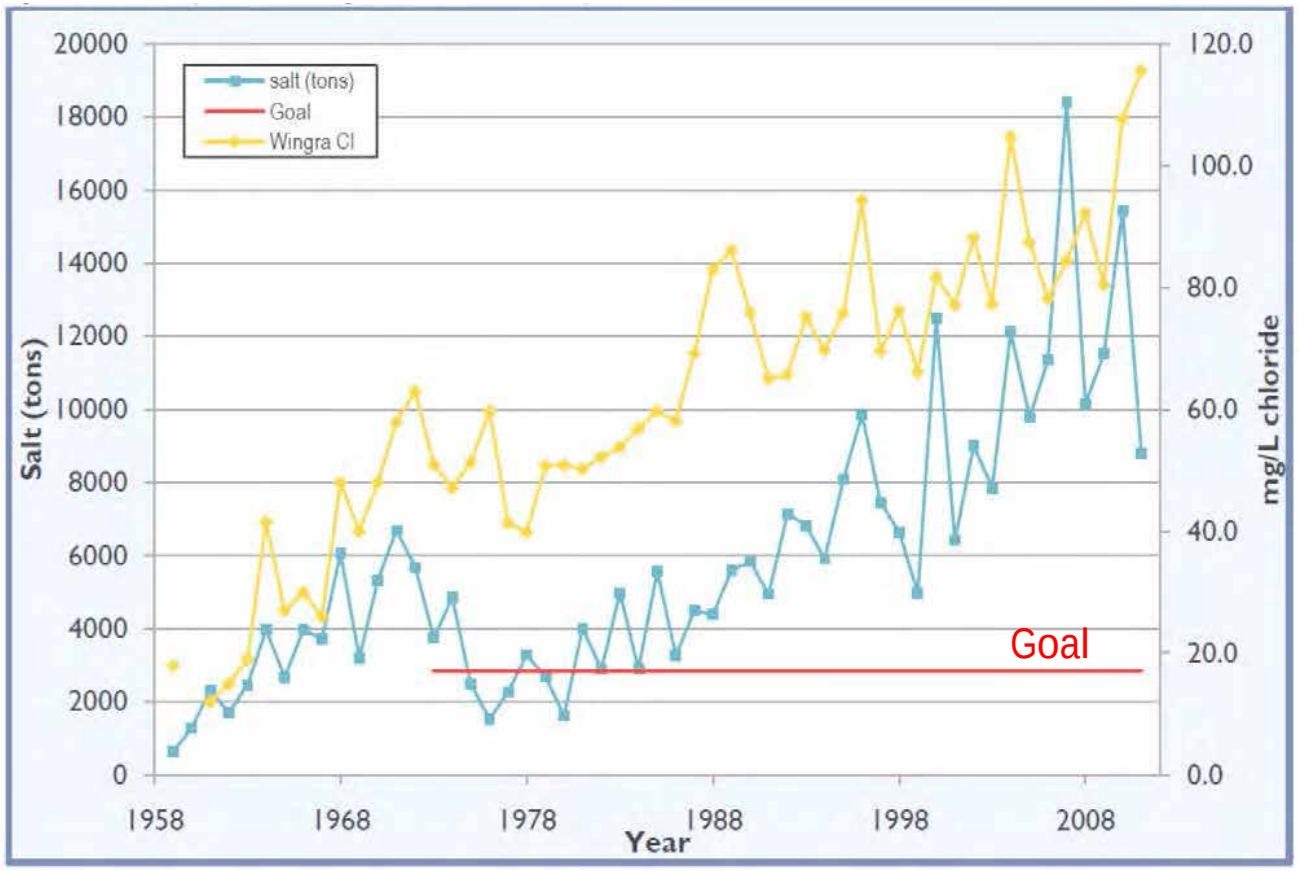


Thaws send brine plumes with high toxicity into Wingra

Rock salt on SW Path also contributes to near-toxic levels of cumulative chloride in lake

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*)



Impacts of salt and brine on path users

Brine soaks into shoes and socks

Creates perpetual mud puddles

Incompatible with winter sports

Corrodes Bicycles

Freezes and injures dog's paws

Corrodes infrastructure

LINKS:

- SW Path Alliance
- DMNA Path History
- Friends of Lake Wingra
- WI Wetlands Association
- Bike Madison
- WI DNR

Share your concerns:

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Alders with districts on the SW Path:

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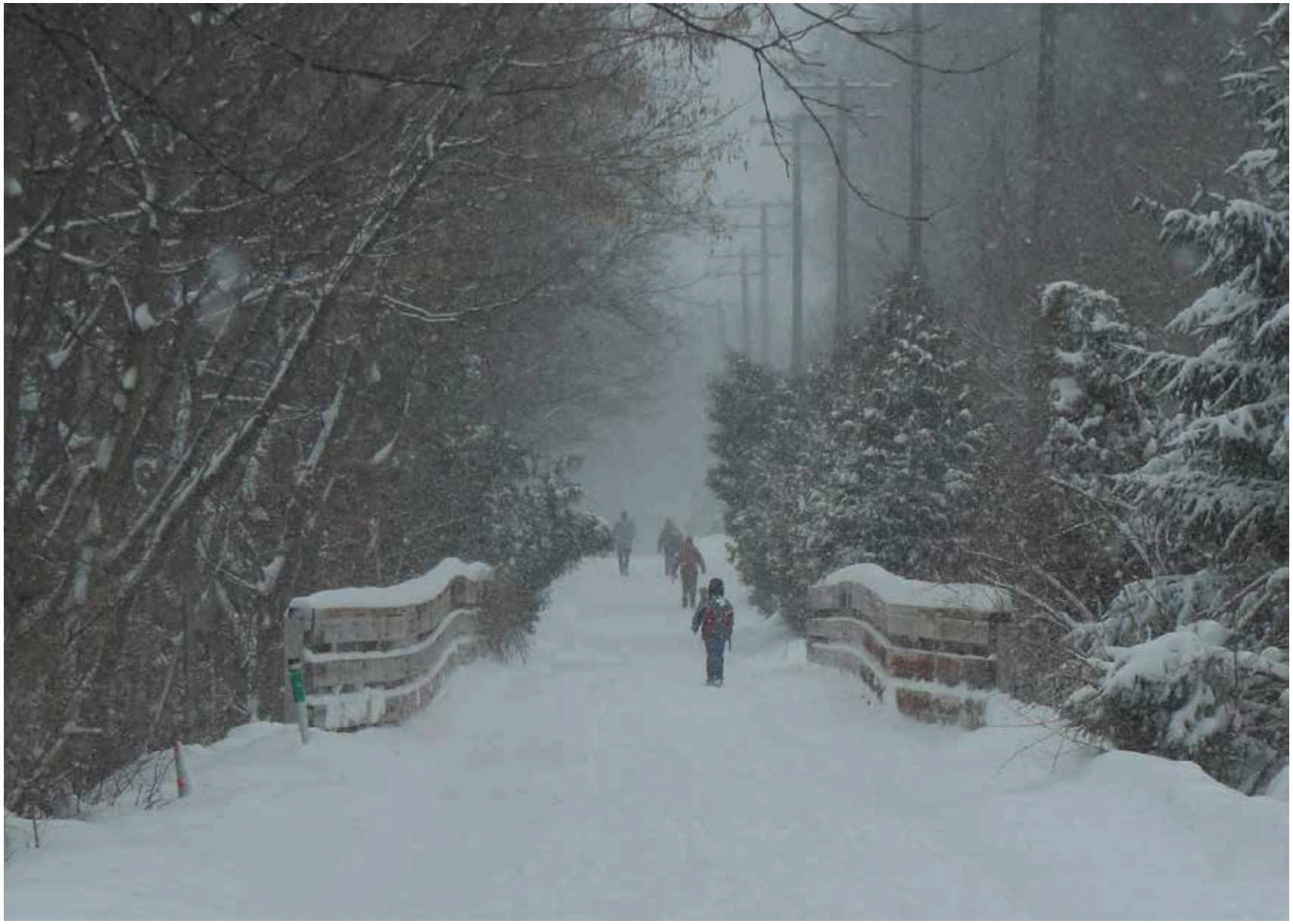
district13@cityofmadison.com



Thanks for valuable input:

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