

Putting Your Community on a Low Salt Diet

NH Lakes 2025 Lakes Congress



Aubrey Voelker
NHDES Salt Reduction Program Coordinator



New Hampshire's Salty History

- First in the nation to use salt for regular winter road maintenance
- Chloride impairment trend is worsening (18 in 2008, 40 in 2010, and currently over 50 impaired waterbodies)
- Chloride contamination of water supply wells has increased by 150 percent over last 30 years





Emergency



Commutin



Tourism



Day to Day Life

**Why Do We
Use Salt?**





Impacts of Winter Salt



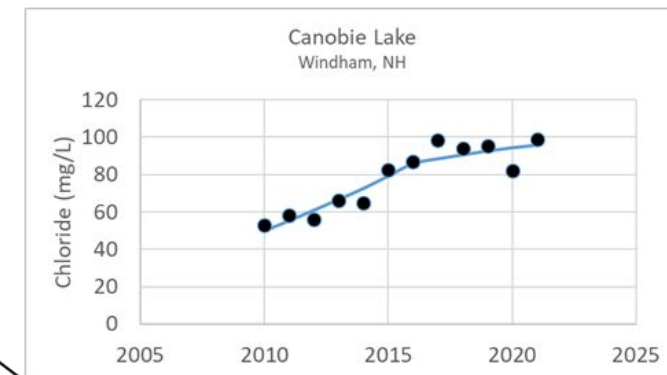
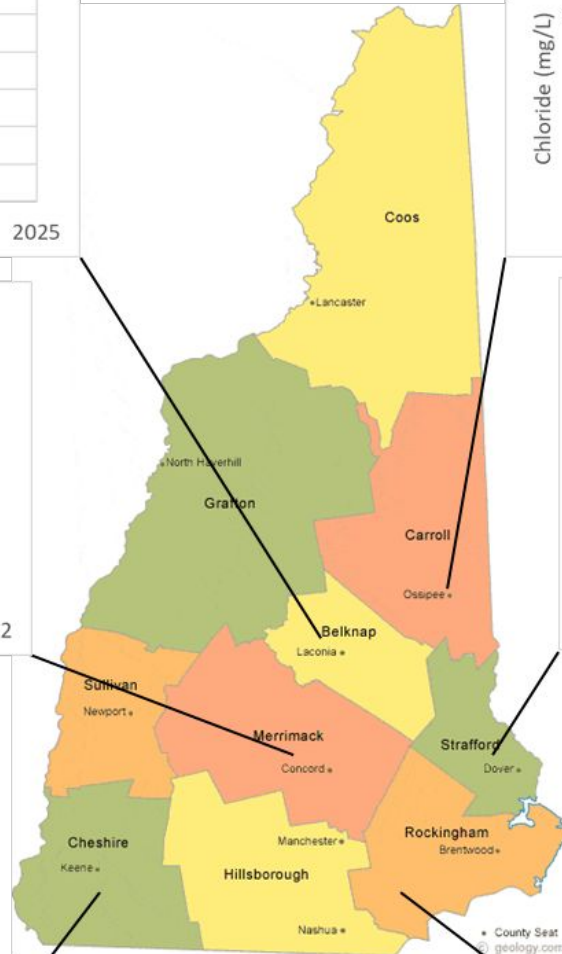
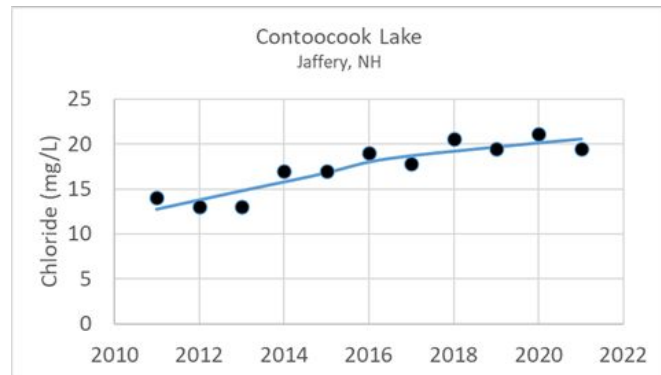
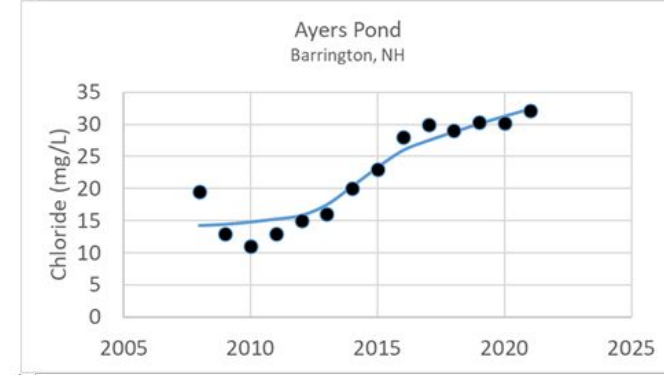
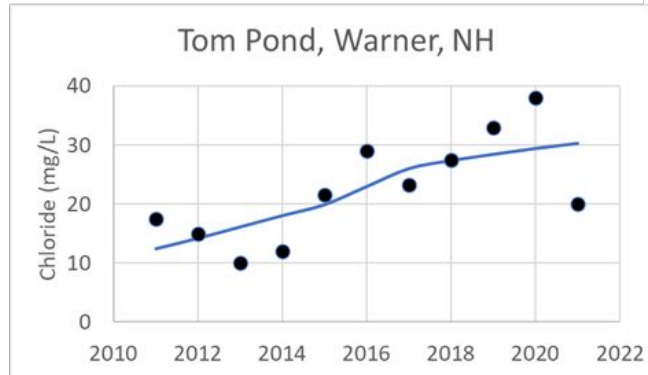
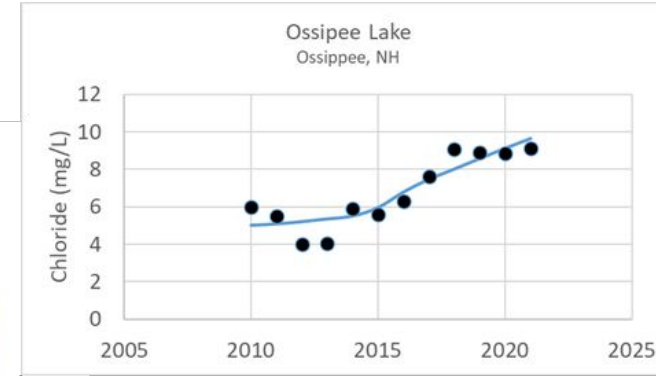
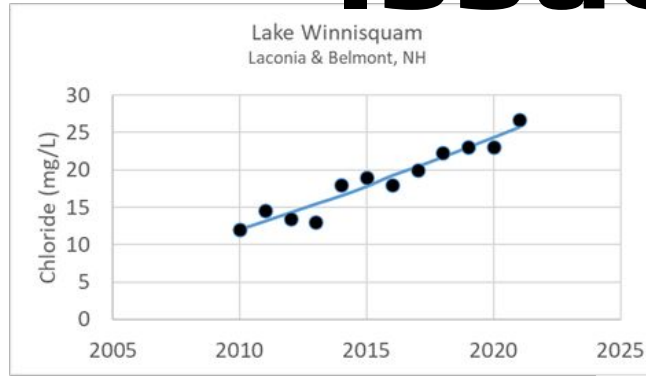


DID YOU KNOW?

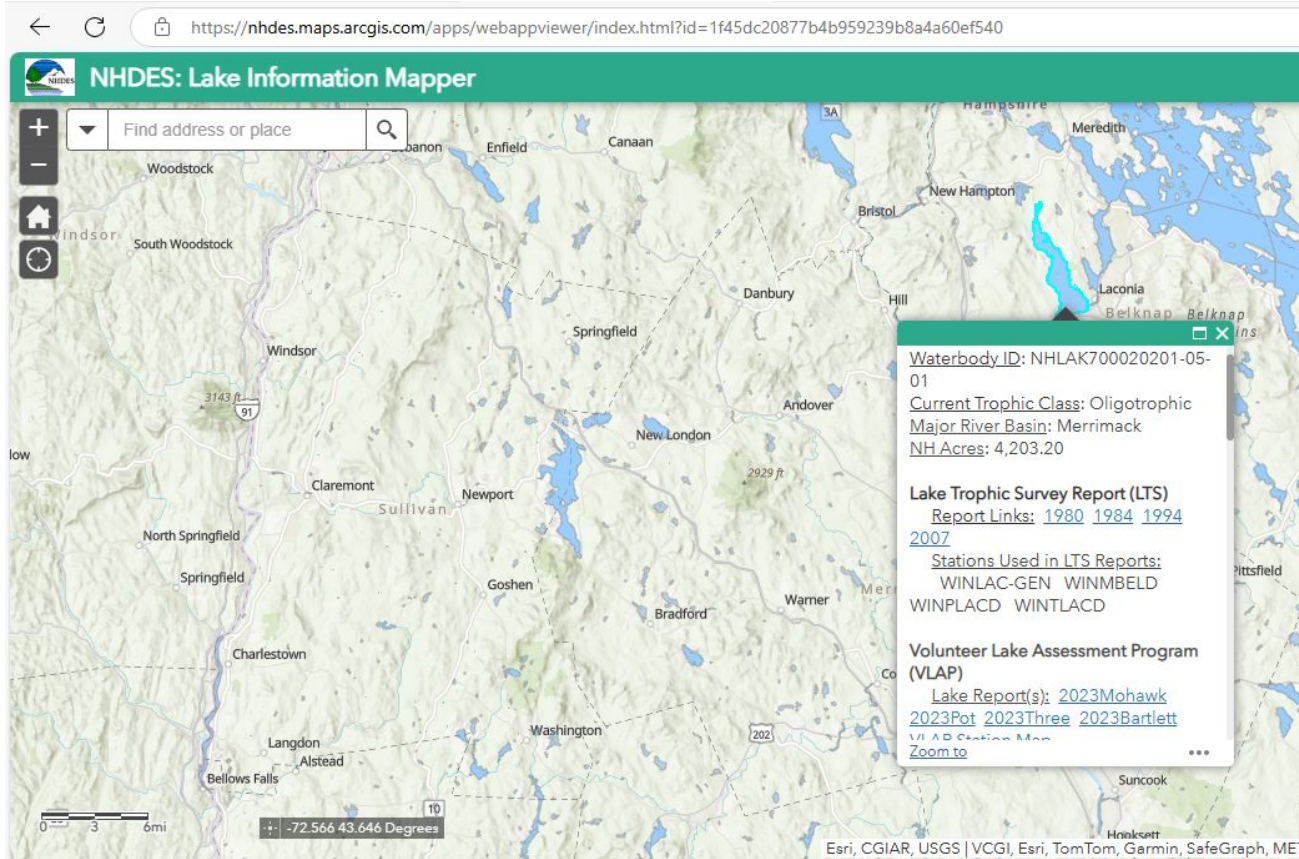
It only takes 1 teaspoon of winter salt to pollute up to 5 gallons of water.



A State-Wide Issue



How healthy is your lake?



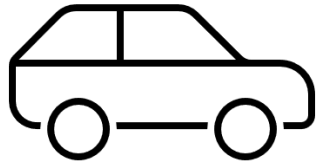
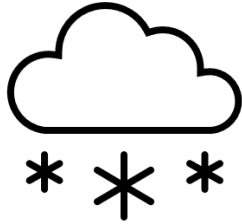
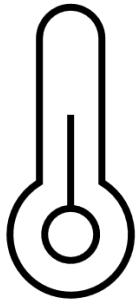
NHDES Lake Information
Mapper

<https://www.des.nh.gov/tabbed-content/lake-information-mapper>

If oversalting is the issue,
then can't we just apply
less salt?



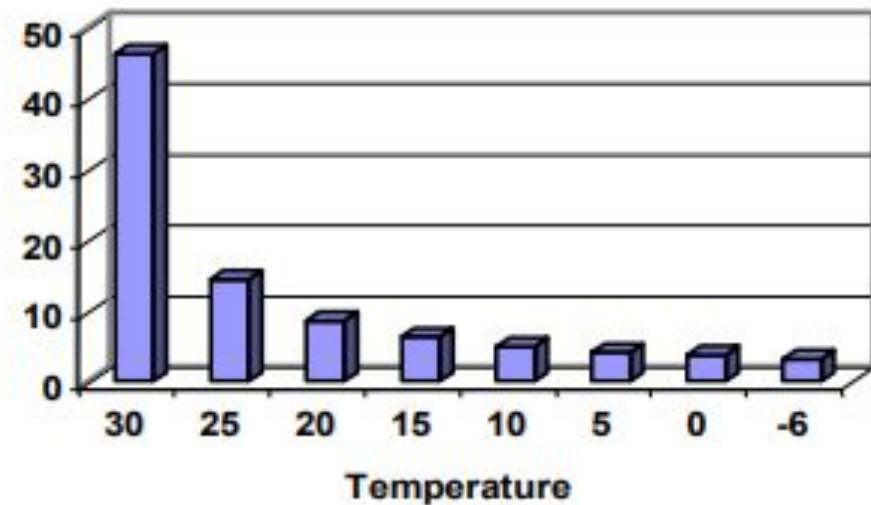
Several Variables Impact Application Rates and Winter Clean Up Strategies



Pavement temperature, current precipitation, future precipitation, dew point, time of day, time of year, type of roadway, level of service expectations, parked vehicles, shaded areas, etc.

The effectiveness of salt changes with temperature

Pounds of Ice Melted per Pound of Salt



Graph obtained from The Salt Institute FY03 Snow & Ice Fact #20

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	5 minutes
25°	14.4 lbs. of ice	10 minutes
20°	8.6 lbs. of ice	20 minutes
15°	6.3 lbs. of ice	1 hour
10°	4.9 lbs. of ice	Dry salt is ineffective and will blow away before it melts anything

Melting characteristics

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

Chemical	Lowest practical melting temperature
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
Winter sand/Abrasives	Never melts – provides traction only

Variables affecting application rates

Increase rate	Decrease rate
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

Sand, Beet Juice, Cheese Brine, Oh My!

- Non-Chloride alternatives?
- Sand commonly used independently and in sand/salt mixes
 - Does not melt ice, only provides traction
 - Costly to clean (road sweepers), block drainage systems, contributes to nutrient loading in lakes and streams
- Beet Juice, Cheese Brine, Garlic Salt, Pickle Juice, etc.
 - May lower the effective temperature when added to salt brine
 - Potential impacts of added sugars to aquatic ecosystems – increase bacterial growth?



Science

meets

Management

I-93 Expansion

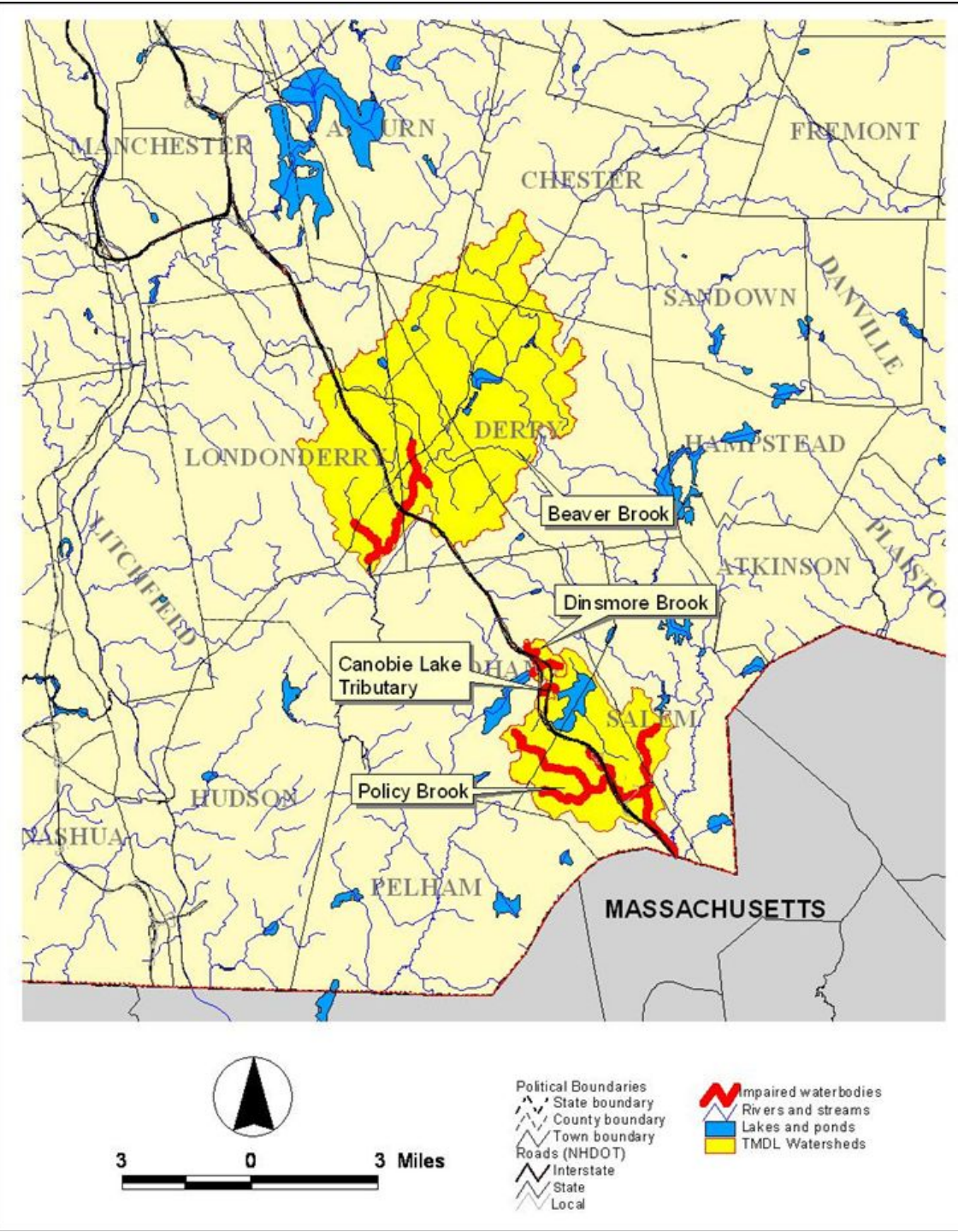
Double the size of the highway.

Bigger off and on-ramps.

Park-n-rides.

Drainage -- open to closed system.

More plowing = more salt.



Parking Lot Areas within the Policy Brook Watershed

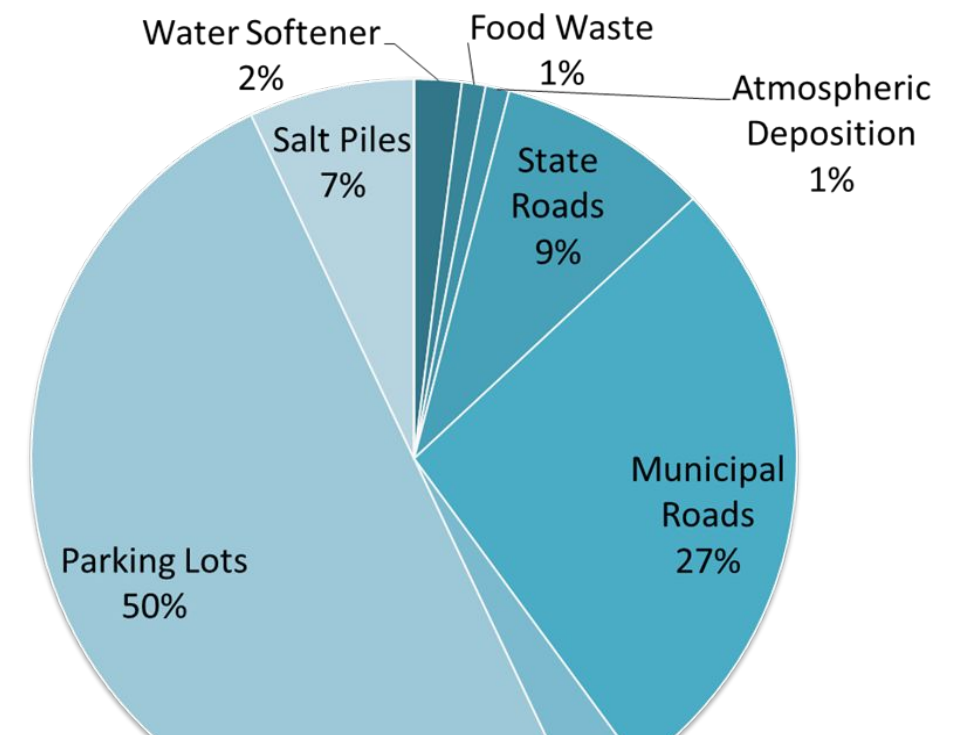
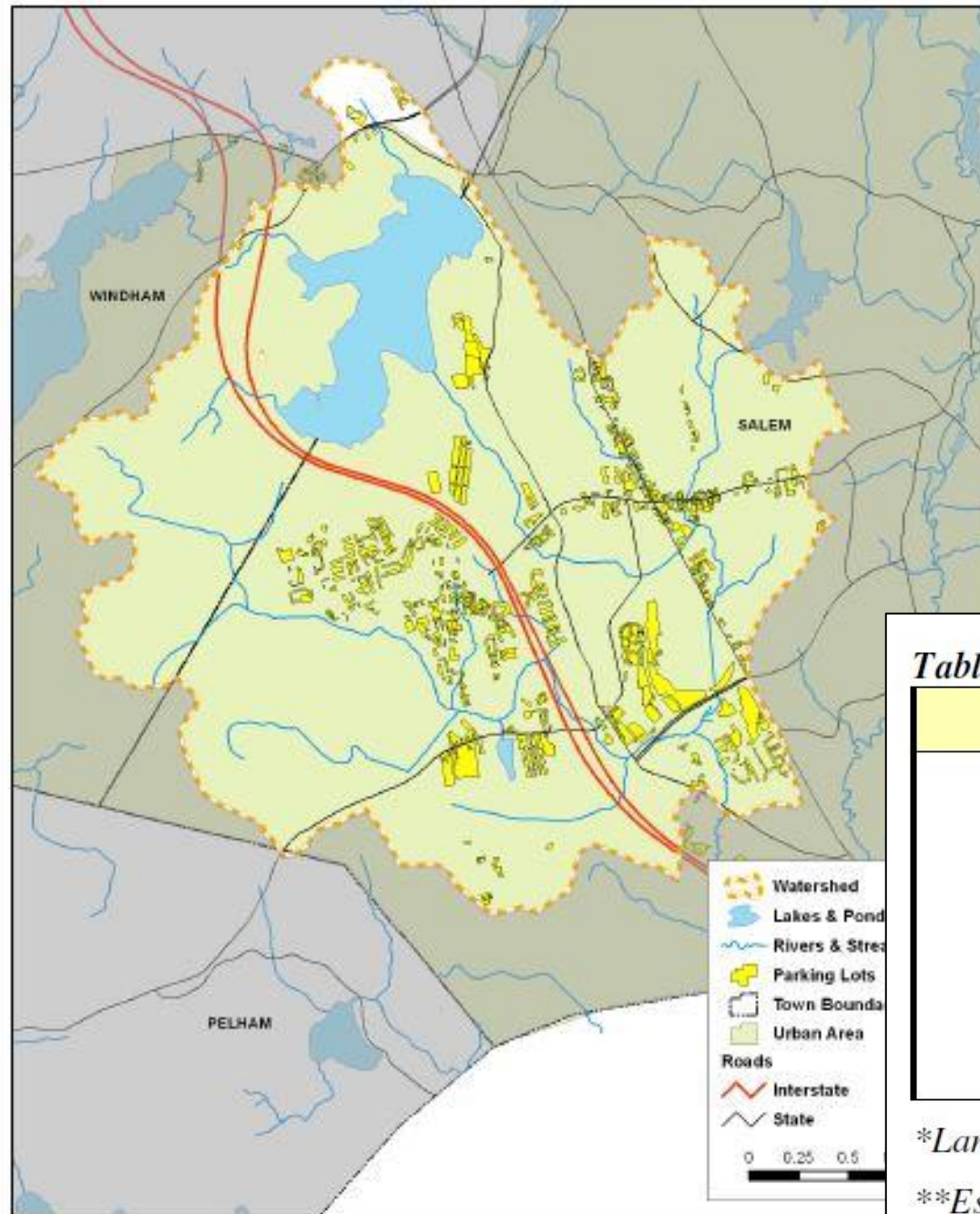


Table 2: Policy Brook Watershed Paved Surface Inventory

Sector	Unit
NH Department of Transportation	37.13 lane miles*
NH Department of Transportation	59.4 lane miles**
Municipal Roads	142.3 lane miles
Private Roads	7.3 lane miles
Private Parking Lots	340.2 Acres (95.3 lane miles)

*Lane Miles maintained upon TMDL completion

**Estimated lane miles to be maintained after I-93 expansion

Nutt Pond, Manchester

US EPA chronic standard for
chloride: 230 mg/L



Table 1. 2023 Average Water Quality Data for NUTTS POND - MANCHESTER

Station Name	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)	
							NVS	VS
Epilimnion	19.7	9.44	192	74	692.0	29	1.57	1.93
Metalimnion	-	-	439	-	1529.0	32	-	-
Hypolimnion	-	-	850	-	2866.7	68	-	-
Inlet	-	-	344	-	1131.0	38	-	-
Outlet	-	-	202	-	677.0	27	-	-





In 2013, House Bill 523 created the Voluntary Commercial Salt Applicator Certification Program: Green SnowPro

NHDES Green SnowPro certified Commercial Salt Applicators and property owners who hire them, are granted limited liability protection against damages arising from snow and ice conditions



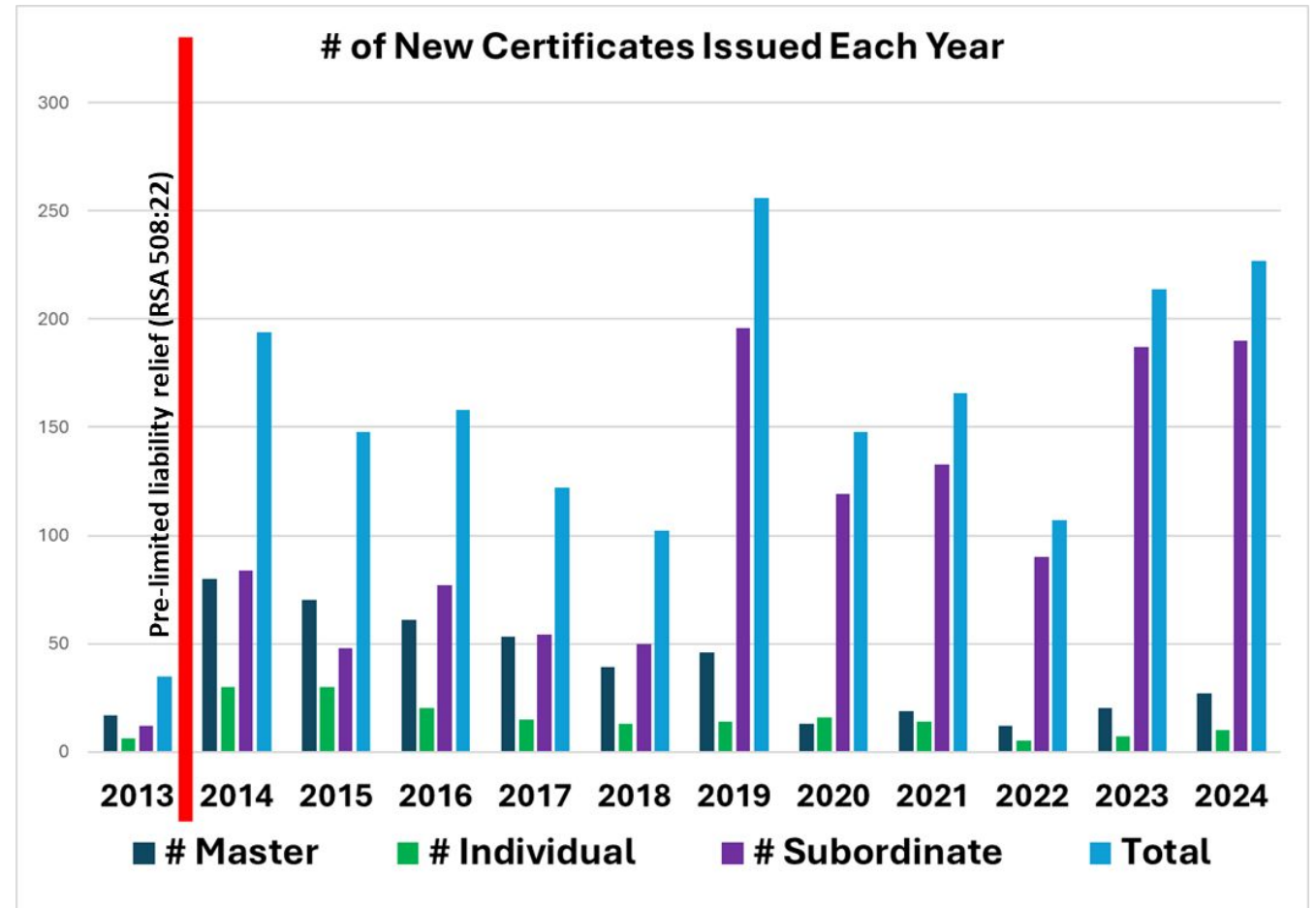
Walking on snow and ice is
inherently dangerous

508:22 Liability Limited for Winter Maintenance. –

II. In order to receive the liability protection provided in paragraph I, a commercial applicator as defined in RSA 489-C:1, II, or an owner, occupant, or lessee of land shall keep a **written record describing its winter road, parking lot and property maintenance practices. The written record shall include the type of de-icing materials used, the rate or quantity of deicing materials used, the dates of treatment, and the weather conditions for each event requiring de-icing.** Such records shall be kept for a period of 3 years.

Commercial Green SnowPro Program

- Reduce the hurdles to salt reduction
- Incentivize training
- Build in accountability
- Normalize behavior
 - Track salt use
 - Better documentation





The State of New Hampshire
Department of Environmental Services

certifies that

Shawn O'Keefe

having submitted satisfactory evidence of knowledge and
training in accordance with the provisions of RSA 489-C
has been awarded this certificate as a

Certified Salt Applicator -- Master

Certificate Number: 358

Date of issue: 07/01/2024

Date of Expiration: 06/30/2025

Erin L. Holmes

Administrator, Watershed Management Bureau

2013/2014 Winter Season

- 35 Green SnowPro certificates issued
- 22 companies



2024/2025 Winter Season

- Over 700 Green SnowPro certificates issued
- 176 companies



1. Coursework



Snowfighters' Seminar



2. Apply & Certify



Commercial Salt Applicator Certification
Application for Initial or Renewal Certification
Watershed Management Bureau



RSA 489-C; Env-Wq 2200



NHDES Use Only
Cert #: _____
Processed Date: _____

I. Applicant Information

FIRST NAME: _____ MIDDLE: _____ LAST: _____
DAYTIME PHONE NO. (include area code): _____ EMAIL: _____

Address

STREET: _____
TOWN/CITY: _____
STATE: _____ ZIP CODE: _____

Mailing Address (if different)

STREET: _____
TOWN/CITY: _____
STATE: _____ ZIP CODE: _____

II. Information for Affiliated Business (if none, enter "none" after Business Name.)

BUSINESS NAME: _____
DAYTIME PHONE NO. (include area code): _____ EMAIL: _____

Address

STREET: _____
TOWN/CITY: _____
STATE: _____ ZIP CODE: _____

Mailing Address (if different)

STREET: _____
TOWN/CITY: _____
STATE: _____ ZIP CODE: _____

If the applicant or affiliated business address is not located in New Hampshire, provide the name and mailing address of a person whose domicile is in the state and who is authorized to receive and accept service of summons and legal notices of all kinds for the applicant as required by RSA 489-C:4, II.


FIRST NAME: _____ LAST NAME: _____
STREET: _____
TOWN/CITY: _____
STATE: _____ ZIP CODE: _____

Annual Renewal


Certification must be renewed annually

- Renewal Application
- Annual Salt Use Report
- Continuing Education

NHDES-W-07-071



ANNUAL SALT ACCOUNTING REPORT
 Voluntary Certified Salt Applicator Program
 Watershed Management Bureau
 Watershed Assistance Section



RSA/Rule: RSA 489-C, Env-Wq 2204

Name: Date:

Certificate Number: Type of Certificate:

Affiliated Business Name: (if none, enter "none")

Below are the three reporting elements necessary for recertification under the Voluntary Certified Salt Applicator Program (aka. Green SnowPro) per Env-Wq 2200.

1) Deicer type and amount.
 Complete the table below for each type of deicer used last winter including the unit reported. If you do not know the amount of deicer used by type please report the total amount of all deicers used in the TOTAL row at the end of the table.

TYPE OF DEICER USED	SOLID MATERIAL AMOUNT: (indicate tons, pounds or yards)	LIQUID VOLUME: (in gallons)
SALT, DRY		
SALT, PREWETTED IN THE SPREADER		
SALT, PREWETTED IN THE PILE		
CALCIUM CHLORIDE, DRY		
CALCIUM CHLORIDE, LIQUID		
CALCIUM MAGNESIUM ACETATE, DRY		
CALCIUM MAGNESIUM ACETATE, LIQUID		
POTASSIUM ACETATE, DRY		
POTASSIUM ACETATE, LIQUID		
SAND		
SAND/SALT MIX		
LIQUID BRINE		
OTHER:		
TOTAL DEICER USED LAST WINTER		

Form Continued on Next Page →




**Pumpkin spice is here today,
but snow and ice are on the way.**

**It's time to start the preparations,
and ease the winter trepidations.**

**Reduce your winter salt application,
by performing salt spreader calibration.**

**Prewet the salt and mix the brine,
reducing chlorides is divine.**

**Be prepared for the winter snow,
and make sure you're a certified Green SnowPro.**















UNH T2 Liquids Field Day



UNH T2 Liquids Field Day

Continuing Education



NH Salt



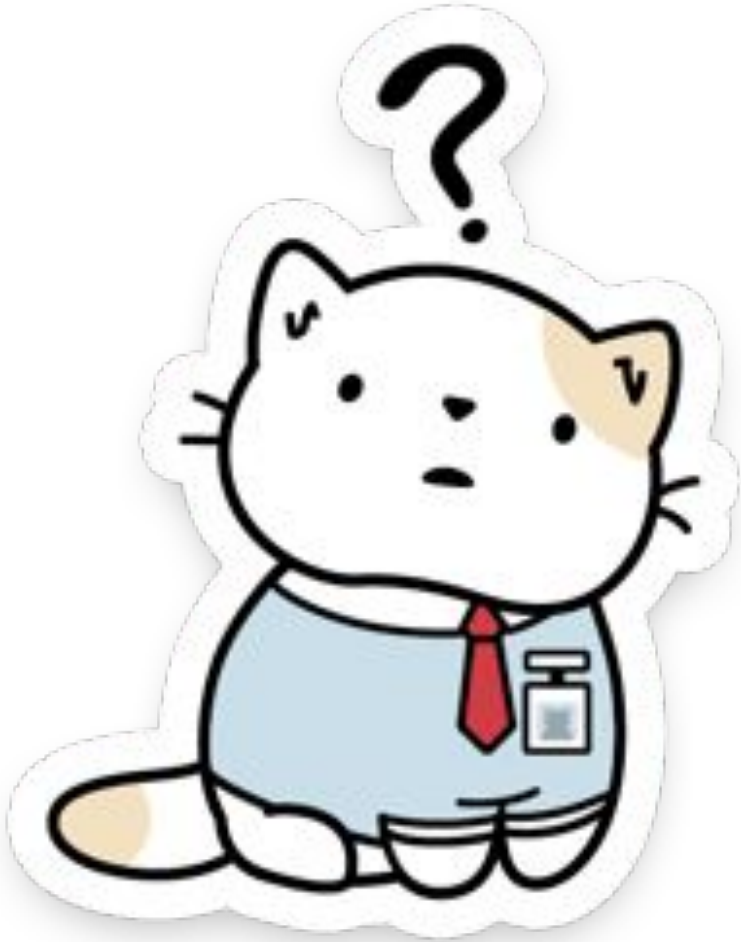
NH Salt Symposium

Municipal Green SnowPro

- The Voluntary Municipal Winter Maintenance Certification (Municipal Green SnowPro) administrative rules were adopted May 2024.
- Allows municipalities to be recognized for their commitment to reducing salt usage in their communities.
- Given that municipalities are commonly the second largest contributor to salt applied in the state each winter, this partnership is key to achieving measurable salt reduction in New Hampshire.

Municipal Green SnowPro

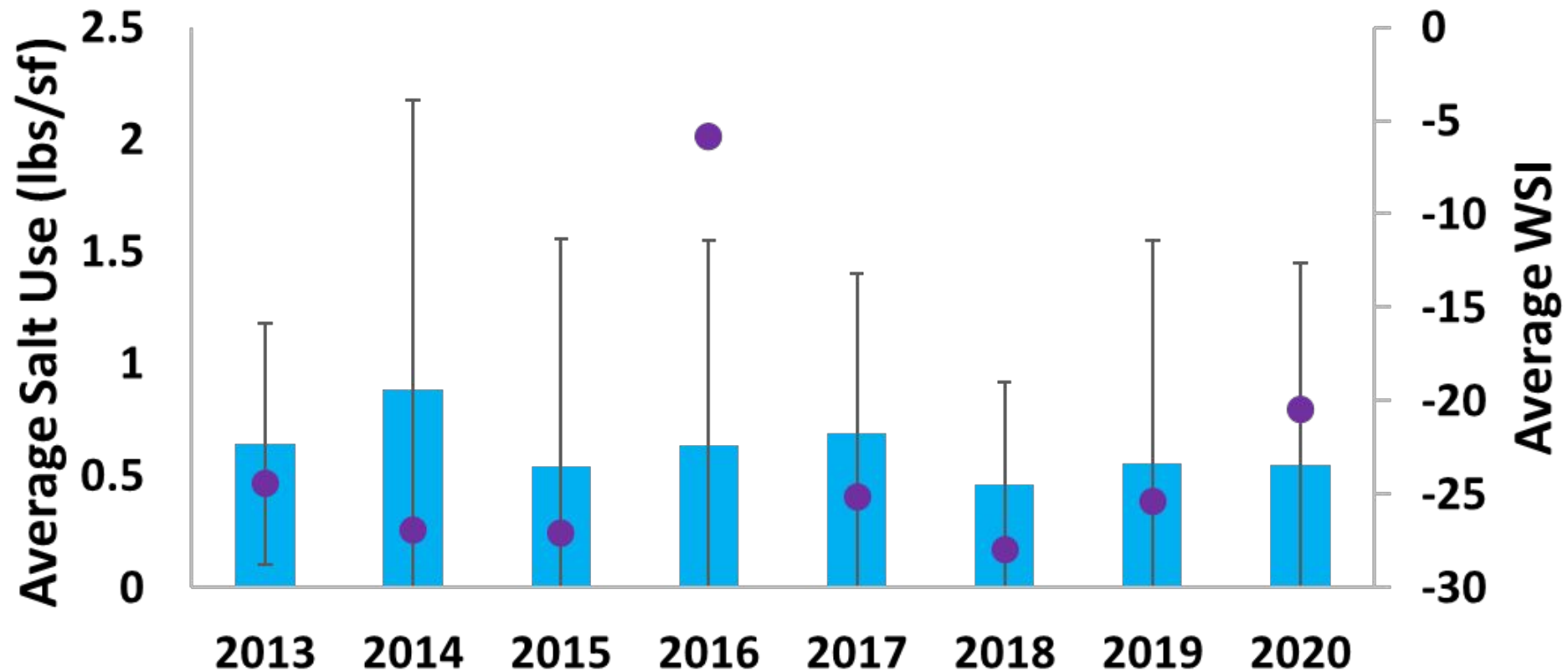
- Three levels of certification available: Standard, Advanced, Expert
- Requires an annual fee, coursework, salt reduction plan, detailed record keeping, storage requirements for materials, tracking salt usage.
- Advanced and Expert require implementing and documenting salt reduction BMPs.
- Future program goal to have funding to provide grants or loans to assist with buying equipment and implementing BMPs.



Is salt reduction being achieved?

ANSWER: IT'S COMPLICATED

Average Salt Use (lbs/sf) and Winter Severity Index (WSI) from 2013-2020



There are many variables to consider when looking at this salt use data:

1. Data analyses could only be performed from a limited number of companies.
2. The WSI is not the only factor influencing salt application rates.
3. Freeze/thaw cycles require salt application even though there was no “winter weather”.
4. Public perception and expectations play a major role in salt application rates.

Merrimack Village District



- Drinking well contamination
- Drinking Water Protection Grant to create a chloride watershed-based plan
- Salt loading allocation, data monitoring, hiring GSP contractors
- All sectors collaborating to address the issue
- Not as easy as just putting down less salt
 - Using the appropriate material at the proper application rates for conditions
 - Changing weather patterns is making it more difficult to apply correctly

What can you do?



SnowPro Tip:

Shovel first before
applying winter salt.



DID YOU KNOW?

A 12 oz cup of winter salt
is enough to cover 10
sidewalk squares or treat
a 20 foot driveway.



SnowPro Tip:
Only apply deicer in
needed locations.



Avoid treating areas
such side door
walkways that are
rarely used.

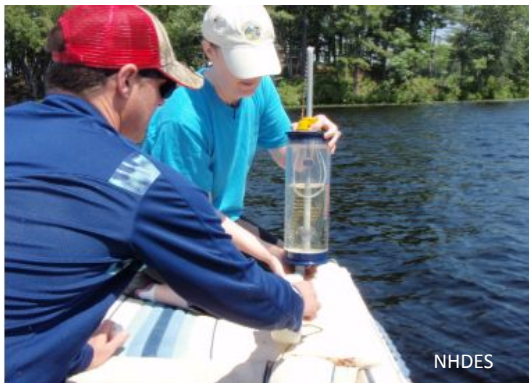


What can you do?



Explore options for low/limited salt zones and area in your community

- State vs Town maintained road
- Who needs to approve?
- Expected level of service



Consider getting involved with the NHDES Volunteer Lake Assessment Program (VLAP)

What can you do?

- Hire Green SnowPro certified contractors to manage your private/commercial property
- Encourage your town and city officials to become Green SnowPro certified
 - Attend trainings



The way to my heart,
I think you know,
is to be
Green SnowPro



To:
From:

Green SnowPro Plows Ahead

- State of the science and industry BMP manual, curriculum, and exams
- Funding to support loan and grant opportunities for education and equipment across commercial, municipal, and state sectors
- Public outreach and education on the impacts of winter salt
- Continue collaborating with all sectors - private, municipal, state - on feasible ways to reduce salt application

Questions ?

Aubrey Voelker

aubrey.r.voelker@des.nh.gov

V

(603) 271-5329

Me: Who am I to judge?

Also me when I see over-salted parking
lots and walkways:

