



Winter Weather Maintenance Program

Jon Nance, PE – Deputy Chief Engineer



Winter Weather Maintenance Program

Overview

Problem

Program Purpose

Policy

Planning

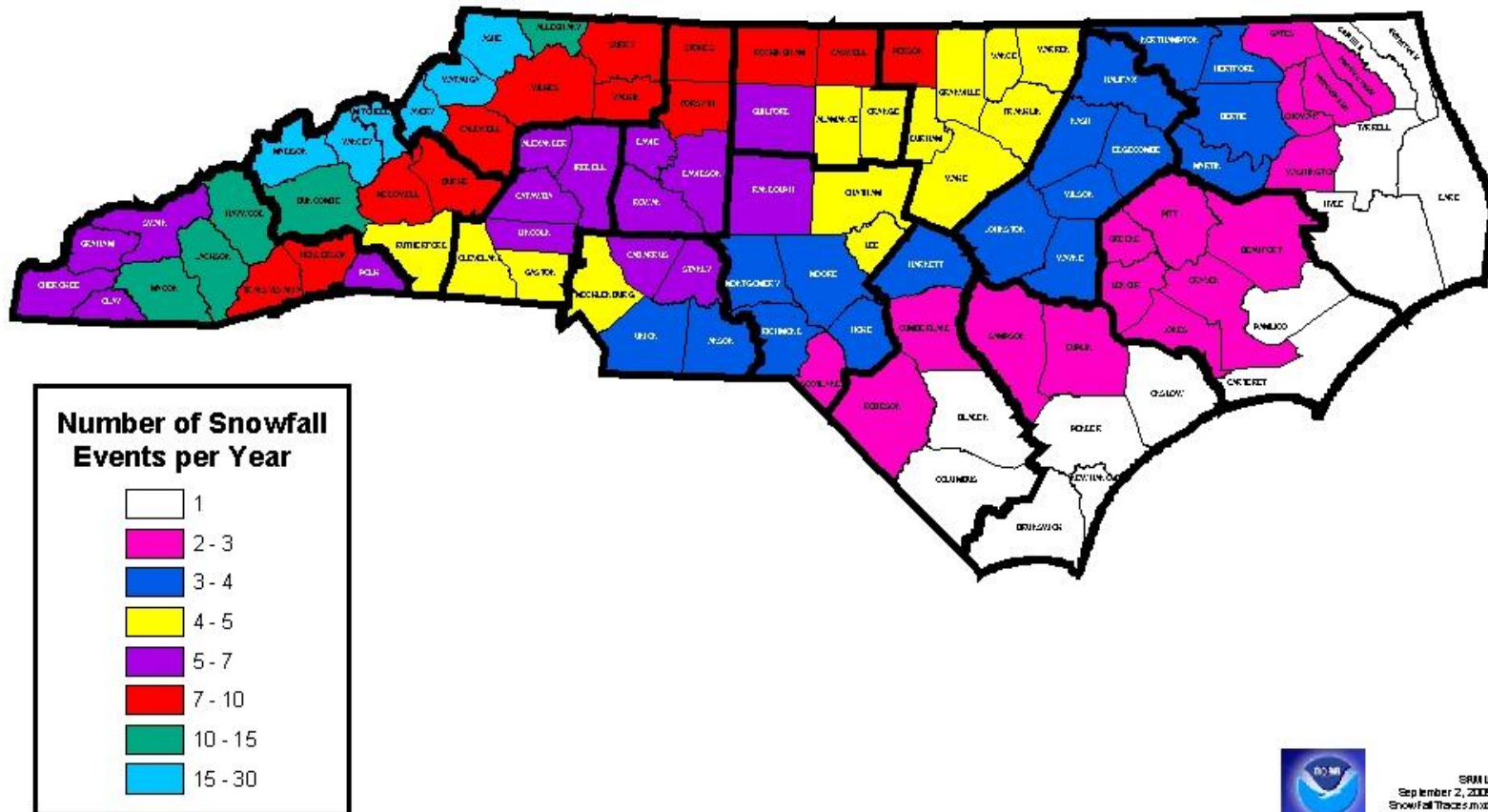
Products

Price





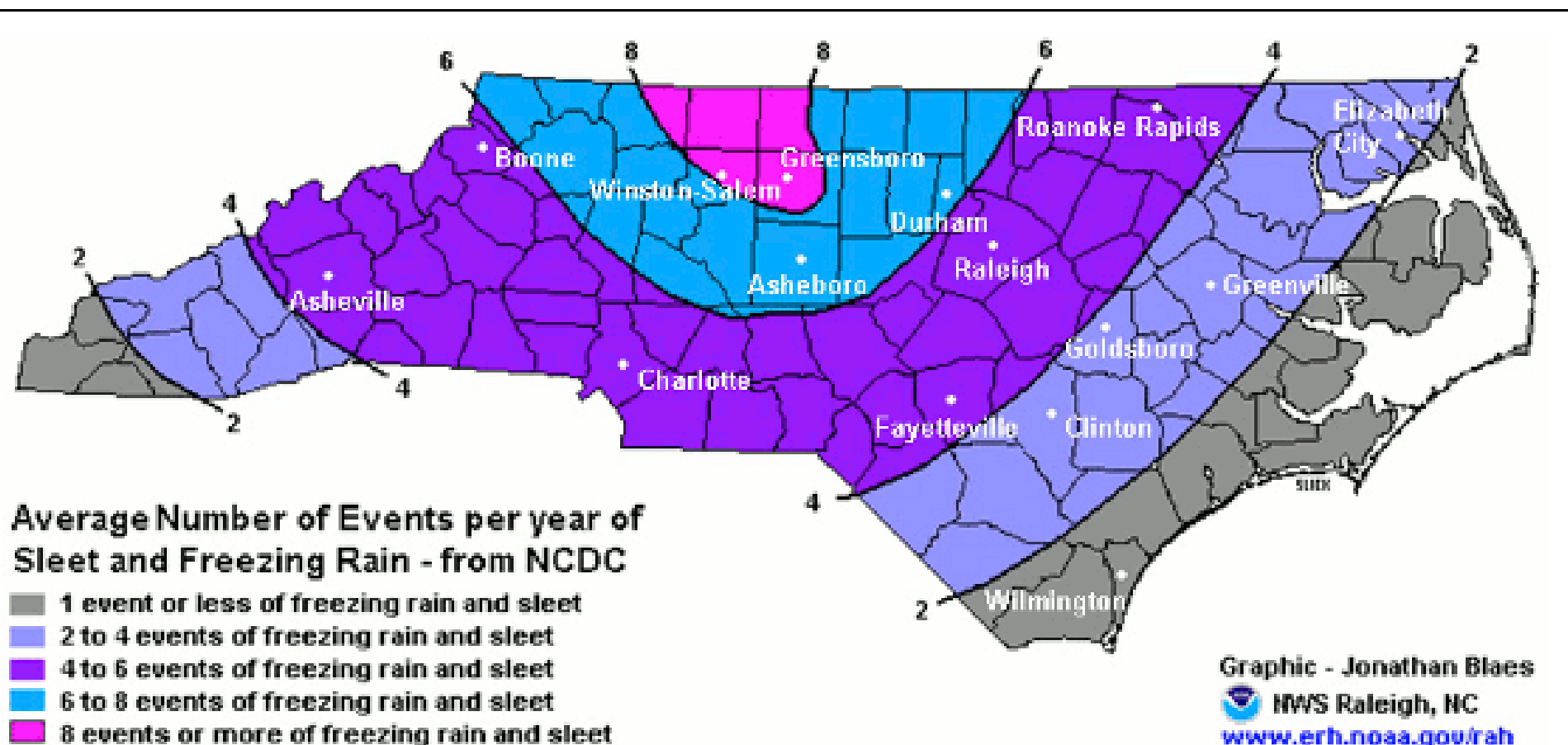
Problem – Annual Snowfall Events





Winter Weather Maintenance Program

Problem – Annual Sleet and Freezing Rain

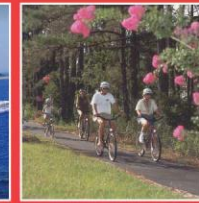
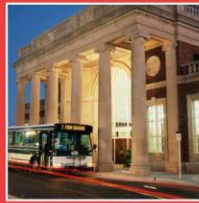
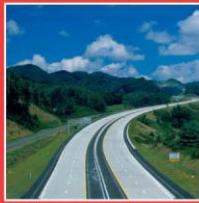




Purpose and Objectives of the NCDOT Winter Weather Maintenance Program:

- Keep traffic moving safely
- Keep commerce and industry at a near normal pace
- Reduce the possibility of accidents, injuries and deaths
- Provide near normal movement of emergency vehicles such as ambulances, fire trucks, etc.





Snow Clearing Policy

Control snow and ice on state maintained roadways in the following priority order:

- Bare Pavement Routes
 - Interstate and Four-Lane Divided Primary Routes
 - Essential Primary and Secondary Routes
- Other US and NC Routes
- Paved Secondary Roads
- Subdivision Roads
- Unpaved Secondary Roads





Salt Use Policy

- Apply Salt to all miles of Bare Pavement System
- Apply Salt to curves, grades and intersections
- Apply Salt at specified rates
(heavier application is discouraged)





Clearance Guidelines

General performance measures:

Statewide Tier – Clear with possible icy spots in 12 hours

Regional Tier – Clear with possible icy spots in 24 hours

Subregional – Clear with possible icy spots in 48 hours





Planning

Phased approach

Bare Pavements (Phase I)

Other Primary and Paved Secondary (Phase II)

Subdivisions and Unpaved Secondary (Phase III)

Mapped Routes

Personnel and Equipment assigned to each route

Supplement State Force Work with:

- Fully Operated Rental Equipment Agreements
- Purchase Order Contracts





Products Used - Effective Storm Response

Anti-Icing – Prevents snow and ice from bonding to pavement

Preventive

Deicing – Removal of snow and ice from pavement after precipitation occurs

Reactive

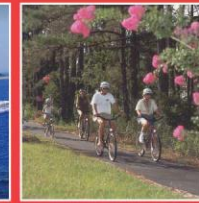
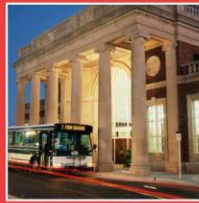
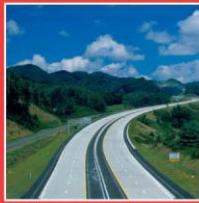




Products Used – Anti-Icing Advantages

- Proactive
- Allows time for plowing mobilization
- In light snows, it may be all that's needed
- Uses less salt
- Costs less
- More efficient snow removal operation





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Products Used – Anti-Icing

Brine

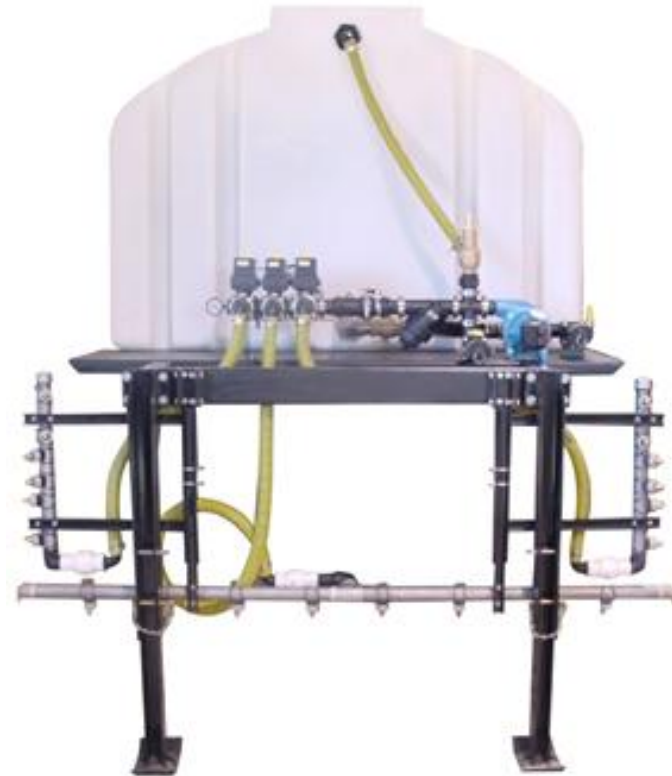
Calcium Chloride





Products Used – Anti-icing Application

- 1600 Gallon Tank
- Ground Speed Control
- Sprays 1-3 lanes
- Free Standing and Self Loading
- Rate: 40gal/lane mile
- Vehicle Speed: 40-50 mph





Products Used – Deicing Strategies

- Standard practice
- Reactive
- Mechanical and Chemical





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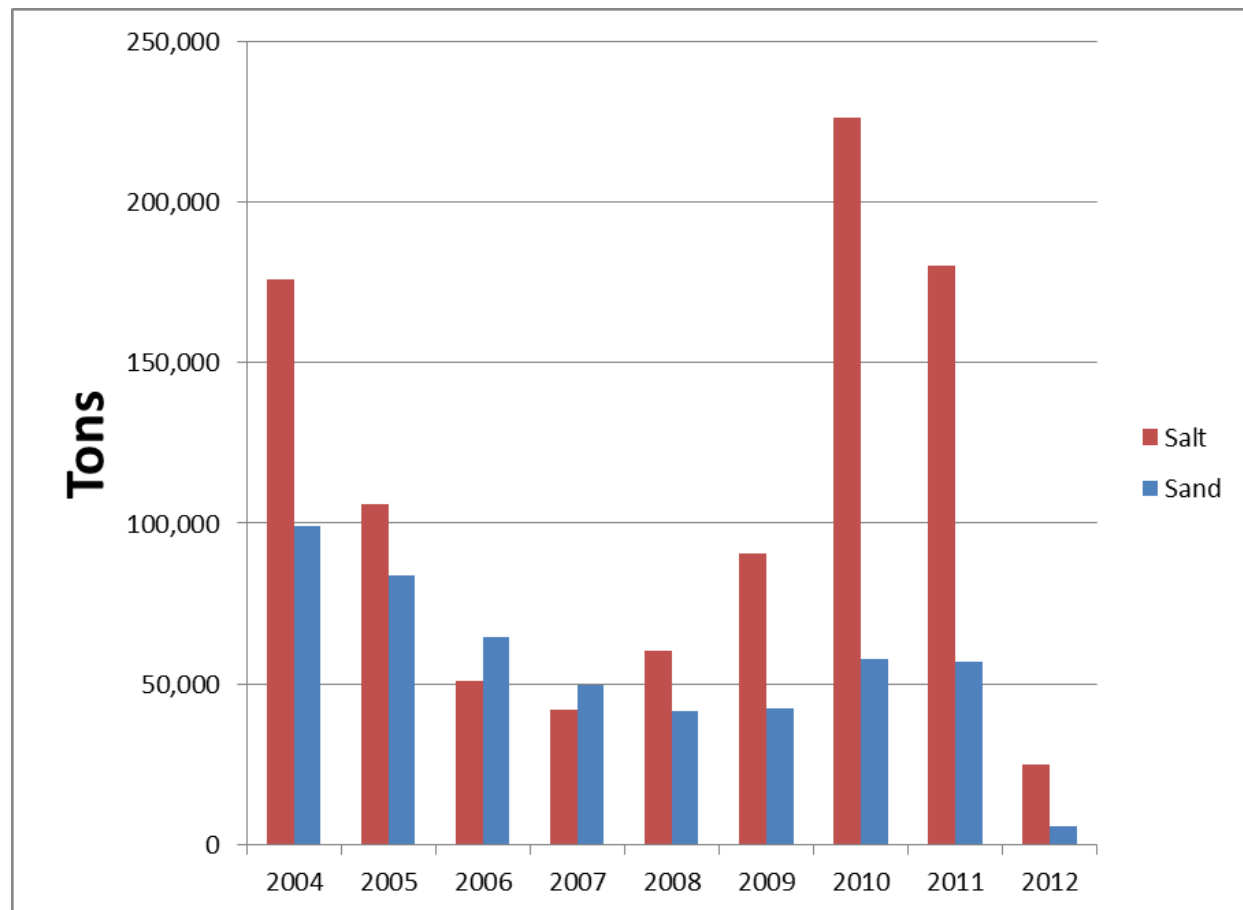
Products Used – Deicing

Sodium Chloride
(NaCl)



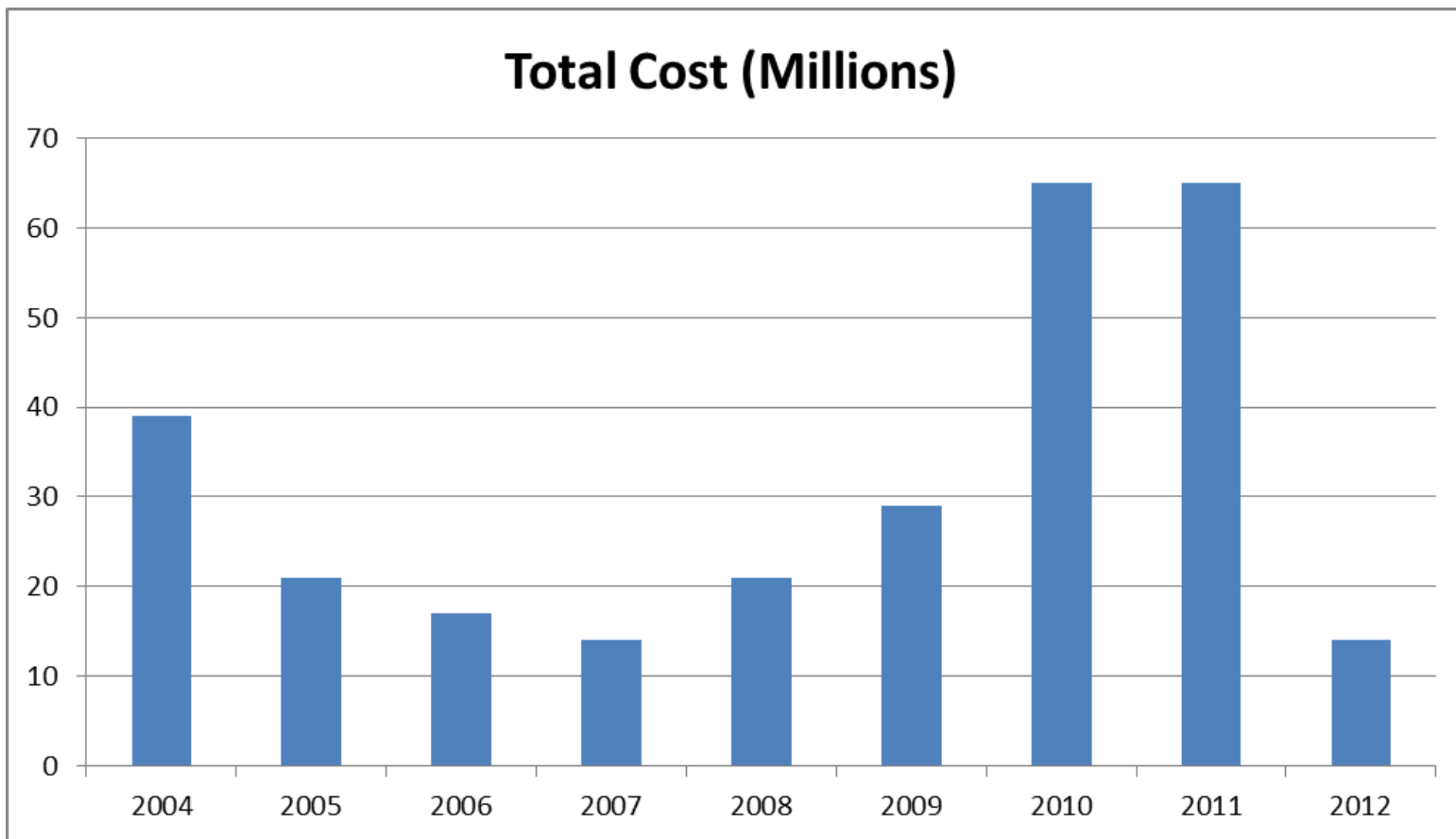


Material Usage





Winter Maintenance Expenditures

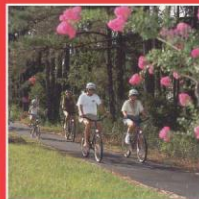
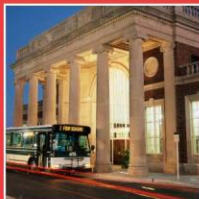
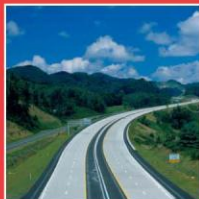




Other Costs

- Road User Cost for Lost Lane - \$10,000 per hour
- Guardrail Repair - \$900-\$1800 per 25' section
- Cable Repair - \$125 per post
- Vehicle repair costs from accidents





Winter Weather Maintenance Program

Winter Weather Maintenance has a Price

State/Province	Lost wages (\$millions)	Lost retail sales (\$millions)	Lost tax revenues (\$millions)	Total per day (\$millions)
Iowa	38.35	19.91	4.51	62.67
Illinois	220.66	98.48	30.43	349.57
Indiana	88.23	41.18	10.94	140.35
Michigan	165.33	71.50	21.65	258.48
Minnesota	97.79	40.32	13.35	149.46
Missouri	90.70	39.05	10.45	140.19
New Jersey	174.44	80.66	25.77	280.87
New York	381.63	161.76	54.18	597.57
Ohio	179.29	79.07	23.14	281.50
Pennsylvania	214.17	93.17	29.37	336.70
Virginia	130.39	56.95	17.64	204.98
Wisconsin	84.82	38.78	10.76	134.36
Ontario	272.02	33.33	51.79	357.14
Quebec	142.77	19.23	28.01	190.01

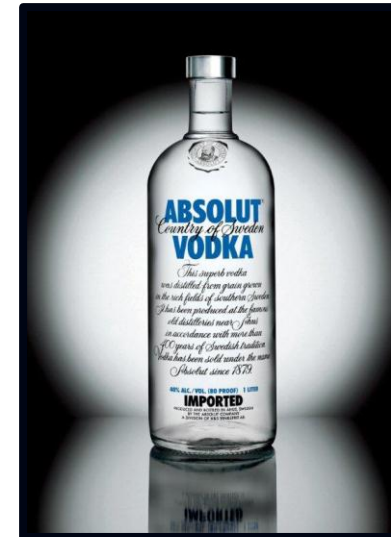
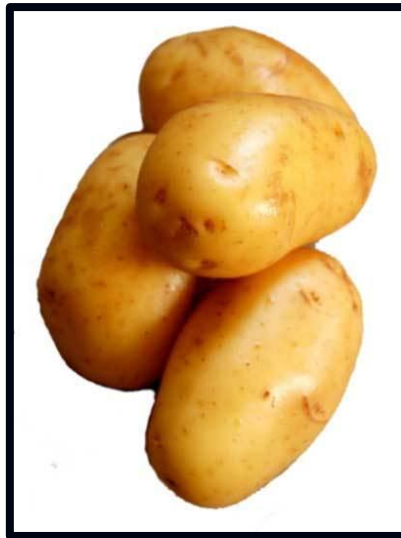




Winter Weather Maintenance Program

Emerging Technologies

- Brine Blending
- Beet Juice
- Vodka...yes we're serious





Winter Weather Maintenance Program

Our Neighbors

- Use Salt Brine for anti-icing
- Similar application rates
- Tennessee leads the way

Across the Country

- Use Salt Brine for anti-icing
- Use other products depending on availability
- Pacific Northwest leads the way





Winter Weather Maintenance Program

Ongoing State Funded Research

“Quantifying Corrosive Potential of De-Icing and Anti-Icing Solutions to Steel and Concrete Bridge Components”
August 15, 2013

“Effect of Brine on Motor Vehicles Under-Carriage and Brake Lining, etc.”
December 31, 2012

UNC Charlotte





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Questions?

