## Introduction

- Share information about yourself and your organization

## Causes and effects of increased use of road salt

- Road salt use has doubled in the past 50 years.
- Increase caused by:
    - Increased development – more impervious surfaces such as roads and parking lots
    - Fear of liability for slips and falls
    - Change in public expectations
    - Lack of knowledge about correct amount of salt to apply
- Deicers used:  sodium chloride (rock salt), magnesium chloride, calcium chloride. All contain chloride.
- More than half the road salt is put on parking lots.
- After the snow melts, salt gets washed directly into creeks, storm drains, and 45% ends up in the groundwater.
- Over time, salt gradually accumulates in the groundwater, making it saltier and saltier.
- Most Pennsylvania streams are fed by groundwater. If the groundwater is salty, the streams will be salty too.
- Problem for environment:
    - Interferes with osmotic regulation, and reduces oxygen content of water.
    - Impacts: zooplankton, amphibians, fish.
    - Ponds/lakes: salty water is denser and sinks to bottom, forming oxygen-deficient layer.
    - Affects aquatic plants.
- Soil and plantings:
    - Rock salt can travel 10 meters off surface – bounce and scatter.
    - Salt damages soil and plantings.
    - Damages green infrastructure e.g. rain gardens.
    - Extremely costly to replace.
- Damage to infrastructure:
    - Corrosion of metal structures – railings, door frames, ramps.
    - Damage to concrete structures e.g. floors of parking garages.
    - Damage to finished floors
- Effects on drinking water:
    - Sources of drinking water – rivers and groundwater.
    - Water treatment does not typically remove salt. To do so is very costly.
    - Sodium problematic for people with hypertension.
- It only takes one teaspoon of salt to permanently pollute 5 gallons of water
- Correct amount of salt:

    - 12 oz sufficient for 20 paving squares. Crystals should be approximately 3 inches apart
    - You don't need to feel the "Crunch" underfoot
    - It only takes one teaspoon of salt to permanently pollute 5 gallons of water
    - **Excessive salt poses slip/fall risk.**
    - After snow events, leftover salt should be swept up.

## Show your pictures and any data you have

## Best Management Practices (BMP's):

- Right amount of deicer at the right time.
- Maintain safety.
- Reduce landscaping expenses
- Reduces damage to environmental and drinking water

- Mechanical snow removal:
    - During and after storm
    - Prevents compaction
    - Reduces need for deicing chemicals
    - Paths and sidewalks:
        - Rotary brooms, snow blowers, snow scrapers
- Segmented or live-edge plows
    - Blade has short, spring-loaded sections
    - Conform to road surface
    - Give cleaner scrape = fewer passes
    - 50% reduction in salt used
- Close high-risk, high-maintenance areas
    - Duplicated sidewalks, stairs, high-risk areas
- Calibrating spreaders –low-cost
    - 50% reduction in salt
    - Calibrate annually, anytime service performed, and for each type of material
    - Mayo Clinic had been using 3 – 6x recommended amount of salt. Their contractors had been using 4 – 15x recommended amount of salt.
- Pre-wetting salt – spraying it with brine
    - Sticks to surface = significant savings in salt.
- Pre-treating with brine:
    - 23.3% solution of salt and water
    - Spray on roads, parking lots, and sidewalks before storm
    - Prevents snow/ice from bonding with surface
    - Melts snow-ice faster than rock salt

    - Easier and faster to plow later
    - 50% less salt needed
    - Can be spread well ahead of storm = savings on overtime
    - Does not cause expensive damage to landscaping

- Salt storage: salt can be dissolved by rain causing runoff and leaching into ground.
    - Under cover – permanent structure or weighted tarp
    - Level site
    - Impervious surface
    - Outside 100-year floodplain
    - Drainage controls to prevent runoff
    - Clean up spills
    - Inspected and maintained regularly
- Temperature sensors
    - Show pavement temperature – important for using application rate charts
    - Hand-held infrared units – inexpensive
    - Truck mounted units – give real-time information
    - In-road sensors – can be used at remote sites
    - Pole-mounted units
- Storage of plowed snow
    - Higher concentration of salt and other pollutants
    - Melting snow piles can leak into waterways and wetlands
    - Should be >100 feet from private wells
- Hiring of contractors
    - Different types of contracts
    - Time and materials contracts reduce the amount of money contractors get if they use less salt - least effective for reducing amount of salt used. contractors
    - Seasonal contracts provide contractors flexibility to use BMP's while assuring they will provide service on when and where necessary.
    - Sample contract from Wisconsin is available for reference.

## Ask for questions