



Facilities and Operations Winter Maintenance

U of M Campus Statistics

Roads	2,448,040 sf,	39 miles 12'wide
Sidewalks	4,596,535 sf,	174 miles 5'wide
Steps/handicap ramps	179,522 sf,	17 miles 24" wide
Surface lots/docks	8,804,531 sf	202 acres
Parking Structures	16	
Total Acres	3200	
Buildings	584	
Students	50,000	
Faculty	7000	
Staff	38,000	

Average Materials Used per Year

Rock Salt	2,400 tons
50 lb bagged material	4,000 bags
Liquid de-icer	300,000 gallons

Winter Maintenance Challenges at the University of Michigan

Operational 24/7/365

Intertwined with the City of Ann Arbor

Diverse surface areas to maintain

Increasing expectations

Microclimate's

Environmental & Infrastructure Sensitivity

Campus Service Level Goals

Keep the University of Michigan campus open to vehicle traffic during any winter storm event.

Pedestrian routes clear of snow 24 hours after typical snow event has ended. 48 hours for larger snows (4 inches or more)

Hospital Community and Child Care Centers— Patients, Staff and Visitors are highest priority

Campus Winter Maintenance – Who does What?

Custodial and Grounds Services maintains all general fund building entryways and surrounding walks as well as most other customer accounts (Michigan Medicine, Northwood Community Apartments, NCRC, etc.)

Parking Services maintains all parking structures and about 75% of the parking lots on campus.

Athletics services their own sidewalks, building entryways and parking lots with some assistance from Grounds.

Some remote sites are contracted (East Ann Arbor Health Center, Wolverine Towers, Varsity Drive property, Argus, etc.)

Campus Winter Maintenance – Communication

Facilities Service Center has all of the information on winter maintenance and contact information for each unit

Contact FSC at 647-2059

- We do not need to be notified that it is snowing...
- We do want to hear about large events or areas that need additional attention

Weather Advisories Email Group

- Used by DPSS (Brad Walvort - Director of Emergency Management) to communicate severe weather forecasts and potential impacts to campus
- Used by F&O (Rob Doletzky - Grounds and Paul Clark - Parking) to send out operational response updates including winter storm warnings
- Contact any of the people above to be added to the email list

Custodial Services

Entryways, steps and ramps

Winter staffing consists of 20 FTE working 6am - 2:30pm as Hybrids.

Hybrid staff work in teams of 2 to 4 people and are responsible for entryway winter maintenance at assigned buildings. This includes entryways, steps and ramps out to the main walk or where the Grounds equipment can access.

Additional support from custodians on afternoon and midnight shifts as needed.

Getting people safely in and out of buildings is the top priority during snow events so building cleaning will be delayed to allow staff to focus on winter maintenance.

Salt is applied as necessary after mechanical removal is performed. Buckets of salt stored at select entryways to allow custodians easy access.

- If there are issues with the placement of buckets or use of salt, please contact your custodial supervisor

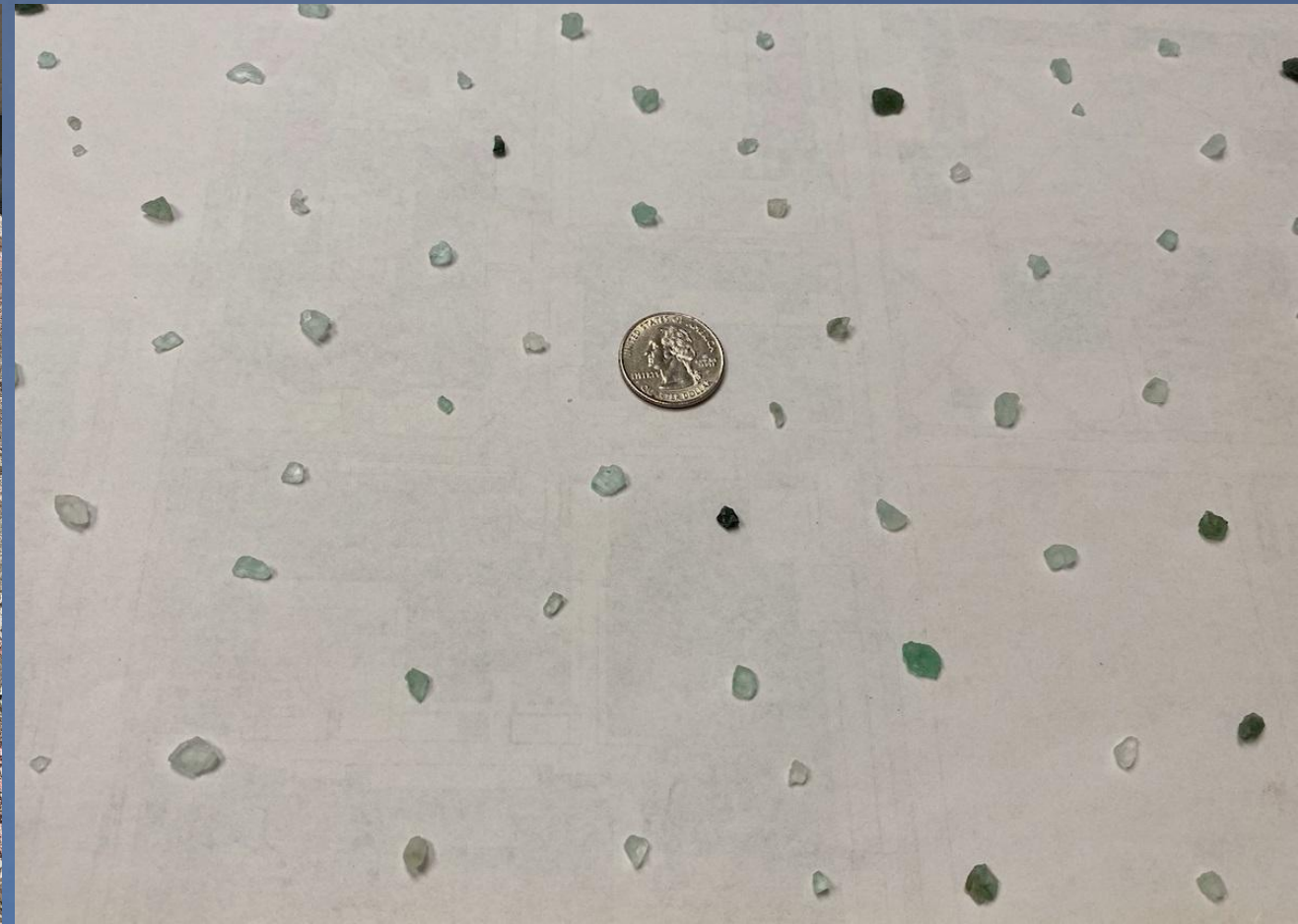
Custodial Services

Entryways, steps and ramps

Incorrect Application Rate



Correct Application rate
1 to 2 inch spacing



Grounds Services

Roads, Sidewalks and Plazas

Winter staffing consists of 75 full time employees. (100 during the summer)

75% of crew is 6am – 2:30pm, 25% skeleton crew off hours and weekends. Overtime prior to shift and/or after shift is scheduled as necessary.

Additional skeleton crew available afternoons, nights and weekends.

Zone routes are prioritized by building hours, events, density of people, special needs and microclimates.

Grounds Snow Removal Equipment

Assigned equipment routes across campus

- 18 Bobcat Tool Cat utility vehicles with rotary brooms, plows, and liquid deicer
- 16 Toro Polortrac with rotary broom, plow and snow blower
- 3 Kubota Tractors with rotary brooms and salt spreaders
- 10 Bobcat utility vehicles with plow and salt spreader or sprayer
- 11 Truck routes for roads and lots with plows and spreaders
- 3 Large articulating wheel loaders
- 2 Skid loaders

Parking Services - Lots and Structures

Parking Services has 21 FTE's

- 14 dedicated to structures (7 on midnights, 7 on days)
- 7 dedicated to lots (all on afternoons)

Equipment:

- 12 Trucks (2 are small dumps)
- 6 Toolcats
- 1 Skidsteer

Space:

- 18 Structures
- 200 Lots – Bulk Road Salt

80% of the surface lots are contracted

Training - Snow Rodeo

- Staff are trained each fall using a competitive style rodeo.
- Each zone trains and competes as a team.
- 6 teams total



Training - Snow Rodeo

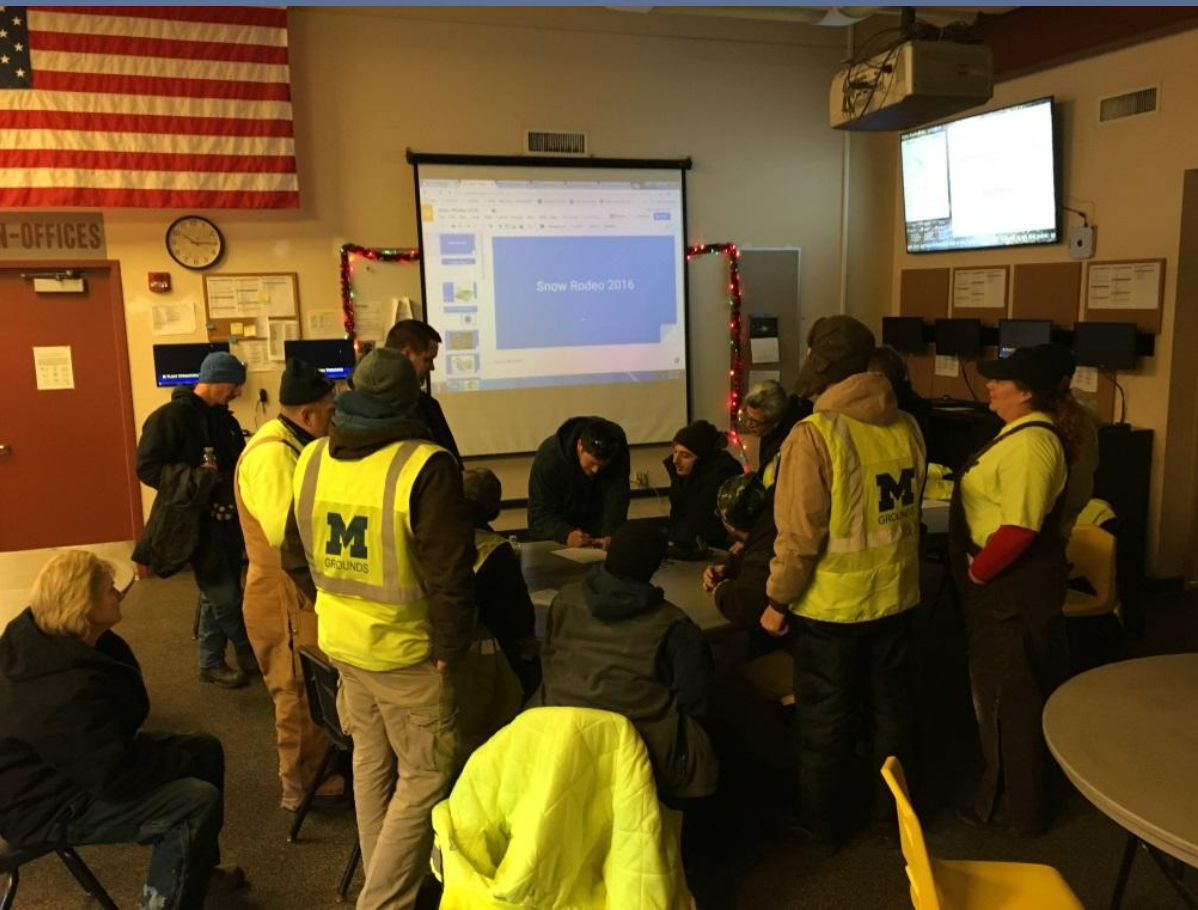
Equipment training consists of:

- Obstacle courses for various types of equipment
- Scoring is based on accuracy and safety (not speed)
- Refresher training on all snow removal equipment



Training - Snow Rodeo

- Salt and the environment refresher presentation
- Knowledge test including weather scenarios - decision making 24/7
- Salting rate and proper application



Best Management Practices for Sidewalks and Entryways

Anti-icing using liquids

Anti-icing is a proactive method of preventing snow and ice from bonding to a surface by applying chemicals to lower the freezing point of water. This allows for more thorough mechanical removal.

Grounds typically applies liquid salt brine ahead of the incoming snow event. Temperature, wind and the type of snow plays factors in the decision of whether or not to apply.



Best Management Practices for Sidewalks and Entryways

Mechanical removal with rotary Brooms, plows or shovels.

Rotary brooming and spraying liquid deicer is the preferred method for light snow events ensuring that we remove as much snow and ice as possible before applying liquid.

For snow over 2 inches changing implements to plows may be necessary.

Granular products may be used for extreme weather situations.



Best Management Practices for Sidewalks and Entryways

Placing snow correctly to avoid melt and refreeze

Try to broom or plow snow to areas correctly on the first pass. In many cases we will need to keep sidewalks “open and passable” by simply brooming to each side of the walk and returning with plows, buckets or snowblowers to move the snow to avoid melt and refreeze.



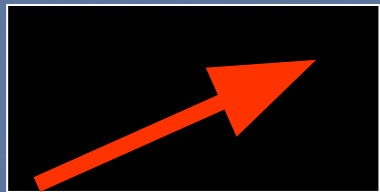
Liquid Deicers on Sidewalks

Increased Service levels

- Proactively anti-icing before the snow falls.
- Allows for easier and more thorough mechanical removal.
- Even distribution of deicer on walkways.

Protecting the environment and infrastructure

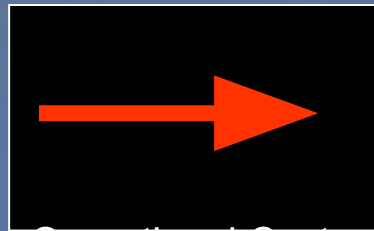
- Using the appropriate amount of deicer limits the amount that enters the environment and damages infrastructure.



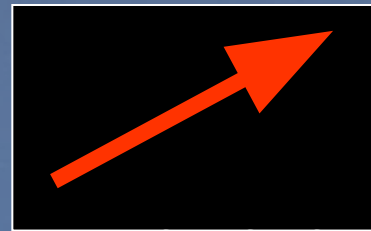
Liquids Use



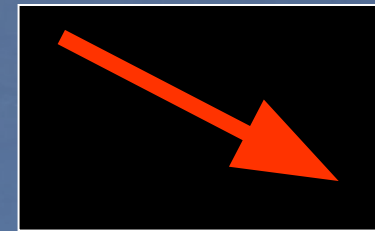
Salt/Sand Use



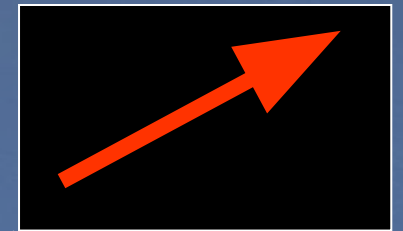
Operational Cost



Useful Life of
infrastructure



Environmental Impact



Safety!

Current Liquids in use:

Salt Brine (23% sodium chloride in solution)

- Used when ground temperatures are above 20 degrees as a de-icer after brooming or direct applications for dustings (1/4 inch or less)

90% Salt Brine / 10% Purchased Product

- Engineered corn byproduct mixed with Magnesium Chloride
- Used for all anti-icing and most other de-icing applications
- Works at a lower temperature than straight salt brine
- Less corrosive

Brine Making and Liquid Storage



2 locations (North and Central)
Total storage of 18,000 gallons

Current Granular Bagged Material in use

For Entryways: Blended products are used

- Blend of Magnesium, Sodium and Potassium Chloride
- Good all purpose de-icer used at entryways.
- Less likely to track into buildings and cause slippery floors.
- Blue or Green color for visual appearance.

Non Chloride option: Sodium Formate/Acetate blend

- Non Chloride de-icer used on sidewalks and entryways.
- Used on new concrete for first season if possible
- 8 to 10 times the cost of traditional products

Winter Challenges

Freezing rain

- Salt dilutes and refreezes in 30 minutes (salting routes take 4 hours)
 - Would take 8 times the resources (staffing, equipment and salt) to keep sidewalks ice free

Large snow events

- Piles of snow in parking areas and plazas
 - Two step process – pile the snow and then haul
 - Running out of areas to pile and haul too
- It just takes longer...

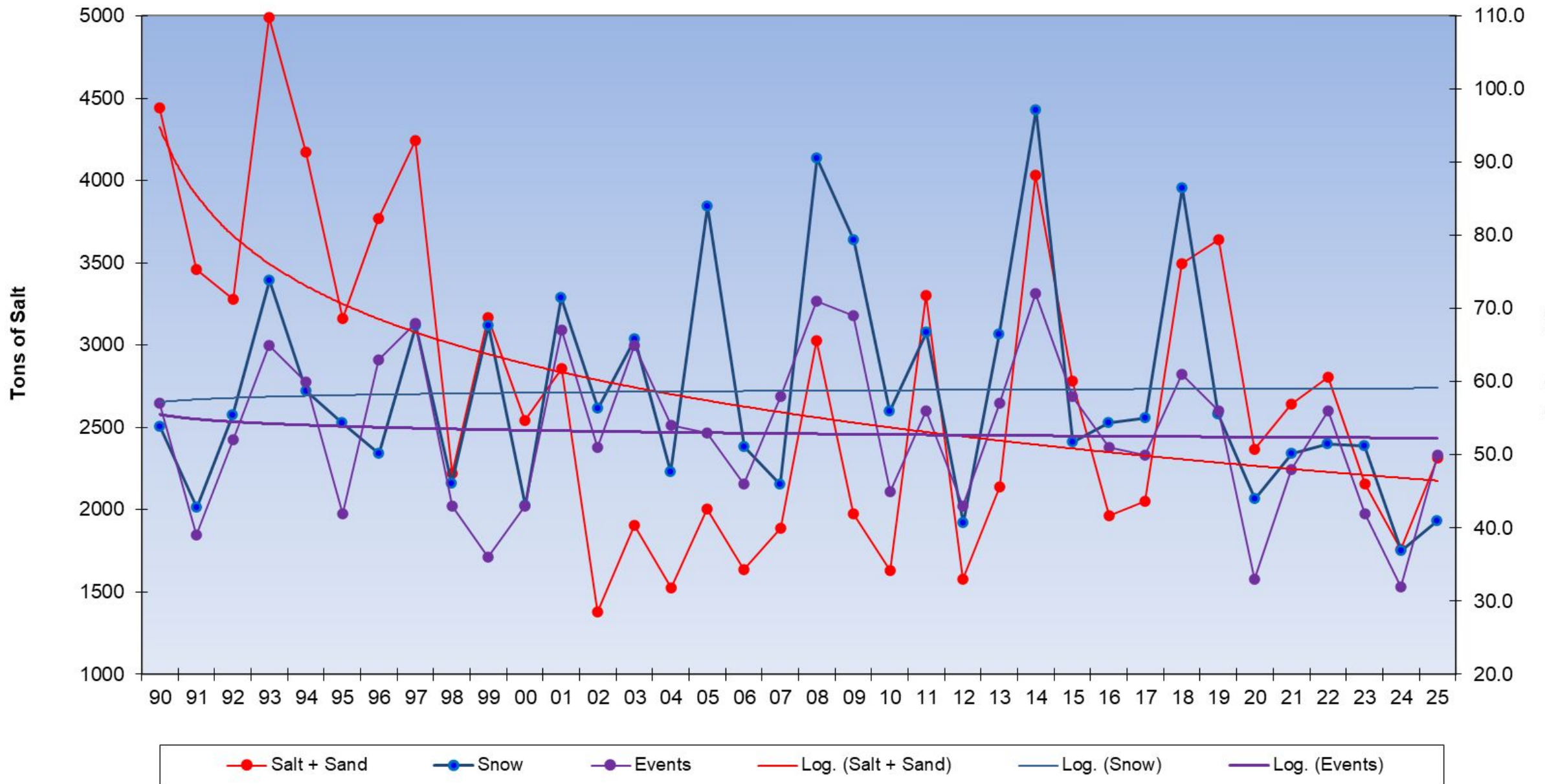
Early and late season snow events

- Most small equipment is also used for lawn care or leaf removal
- Takes 8 hours to “change over” each piece of equipment

Consecutive days of precipitation

- Staff can work 16 hours
- Some staff are put up in Executive Residence
- Equipment needs service or break down

Salt and Sand use vs Snowfall and Events





BUSINESS & FINANCE
FACILITIES & OPERATIONS
UNIVERSITY OF MICHIGAN

Questions?

Rob Doletzky

Associate Director, Landscape and Grounds

doletzky@umich.edu