

University of Michigan Winter Maintenance



U of M Campus Statistics

Roads	1,352,766 sf	21 miles
Sidewalks	4,443,266 sf	168 miles 5' wide
Steps/handicap ramps	119,819 sf	11 miles 24" wide
Surface lots/docks	9,234,720 sf	212 acres
Parking Structures	16	
Total Acres	3200	
Buildings	584	
Students	45,000	
Faculty	7000	
Staff	38,000	

Average Materials Used per Year

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

Winter Maintenance Mission Statement

Establish and promote
Best Management Practices for Winter Maintenance
that minimize deterioration to
Buildings, Infrastructure and the Environment
without Compromising Safety.

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 (up to 4 inches), 48 hours for larger snows (4 inches or more).

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

Contacts

Events, Special requests or Issues:

- Facilities Services Center (647-2059)
- F&O Website -
<http://fo.umich.edu/requestServices.php>

Campus Winter Maintenance – Who does What?

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

Custodial Services help with snow removal at entryways during their scheduled shifts.

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

Athletics handles their own building entryways and parking lots with some assistance from Grounds.

Some remote sites are contracted (Wolverine Tower, Arbor Lakes, Trotter House, Argus, etc.)

Campus Zone Crew Concept for sidewalks and entryways

Winter staff consists of 52 FTE and +/- 35 student/temp workers.

Campus is divided into 5 zones with 2 lead people per zone.

75% of crew is 6am – 2:30pm, 25% skeleton crew off hours and weekends.

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

Typical Staffing and Equipment per Zone

5 Pickup Trucks

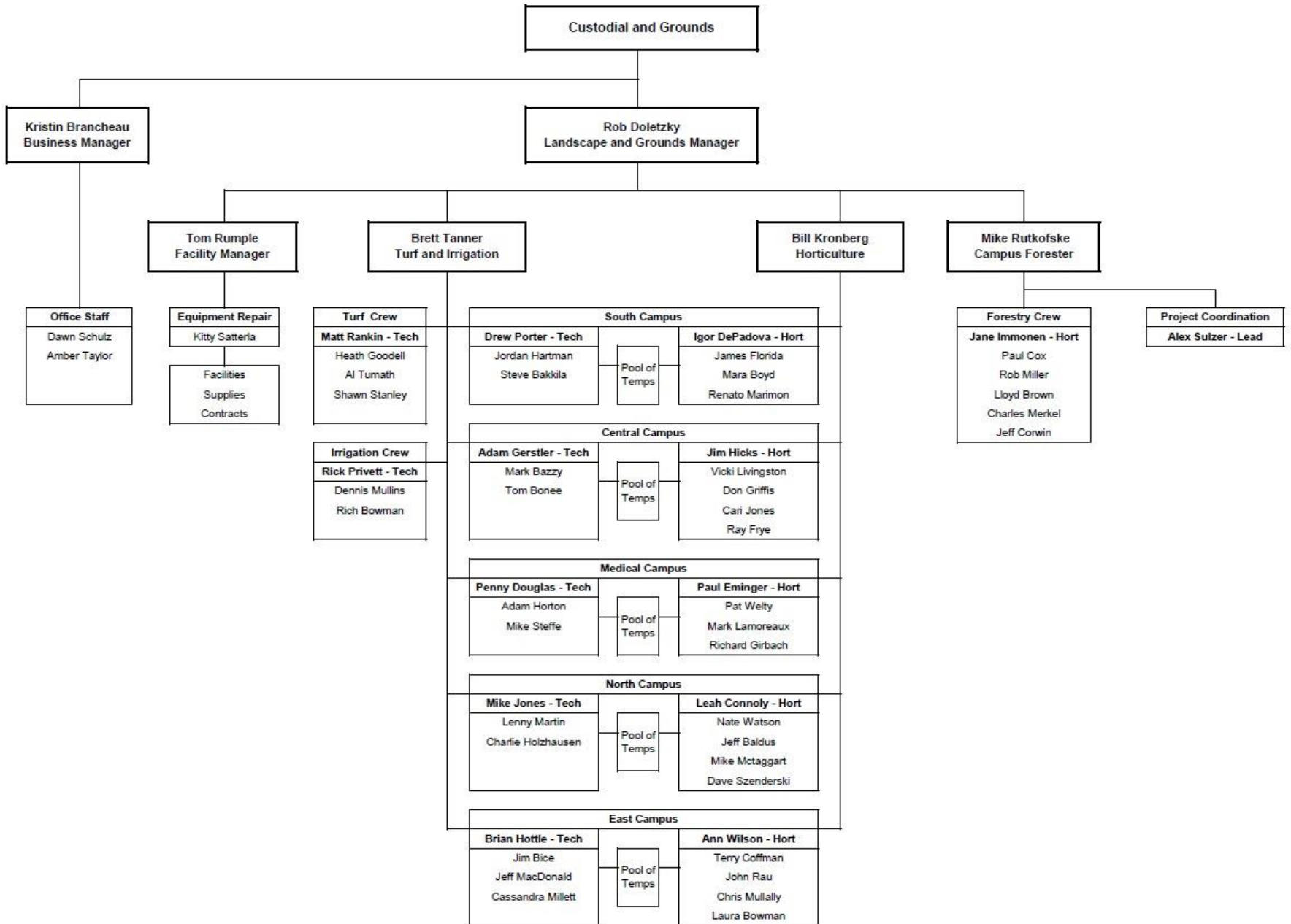
3 Bobcat Tool Cat utility vehicles with rotary brooms, plows, and liquid deicer tanks.

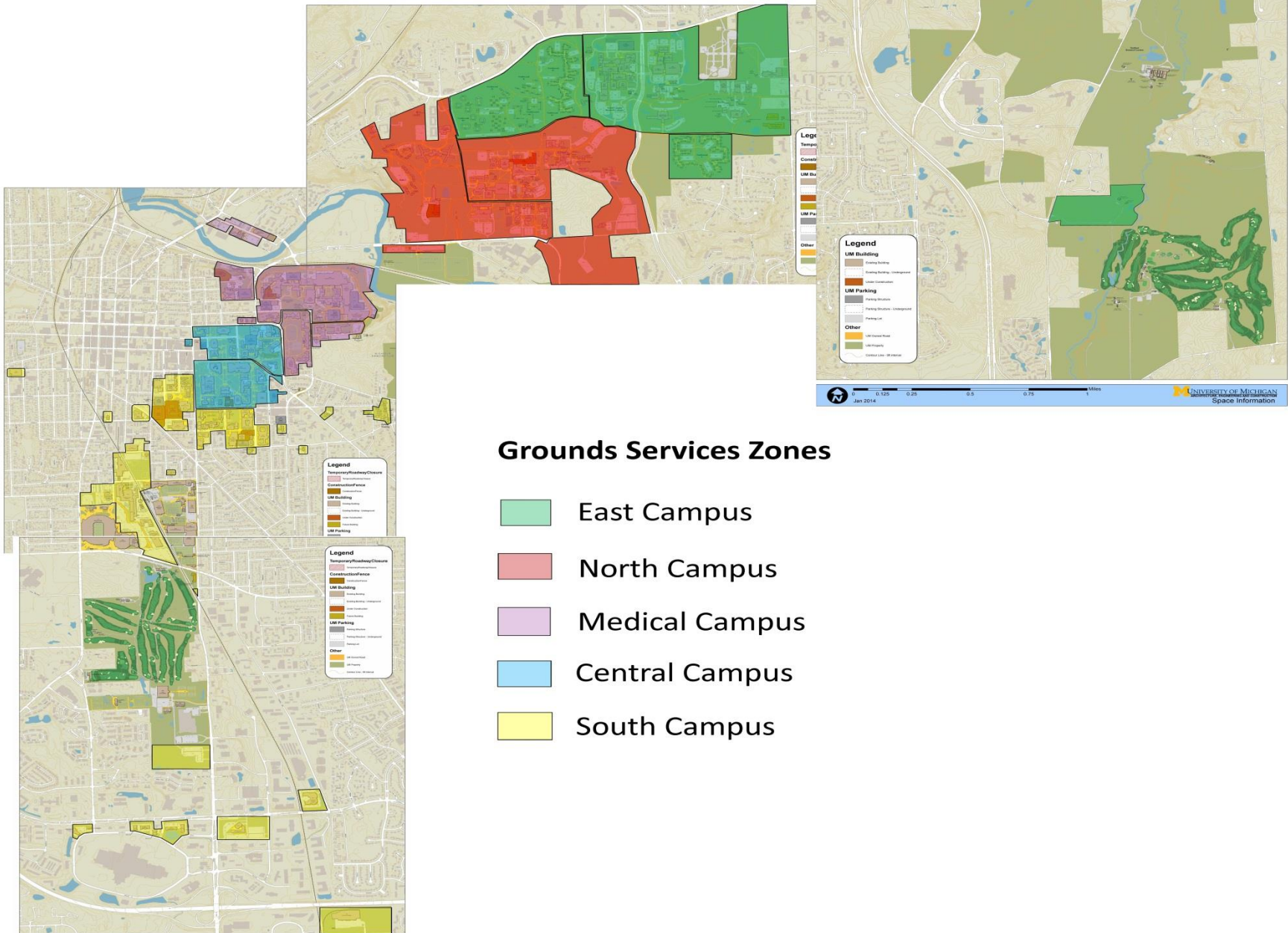
3 Toro Polortrac with rotary broom, plow and snow blower.

1 Kubota RTV 1100 utility vehicle with plow and salt spreader or sprayer.

8 full time staff, 6 temporary staff – 6 am to 2:30 pm

Additional skeleton crew available afternoons, nights and weekends.





Grounds Services Zones

- East Campus
- North Campus
- Medical Campus
- Central Campus
- South Campus

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

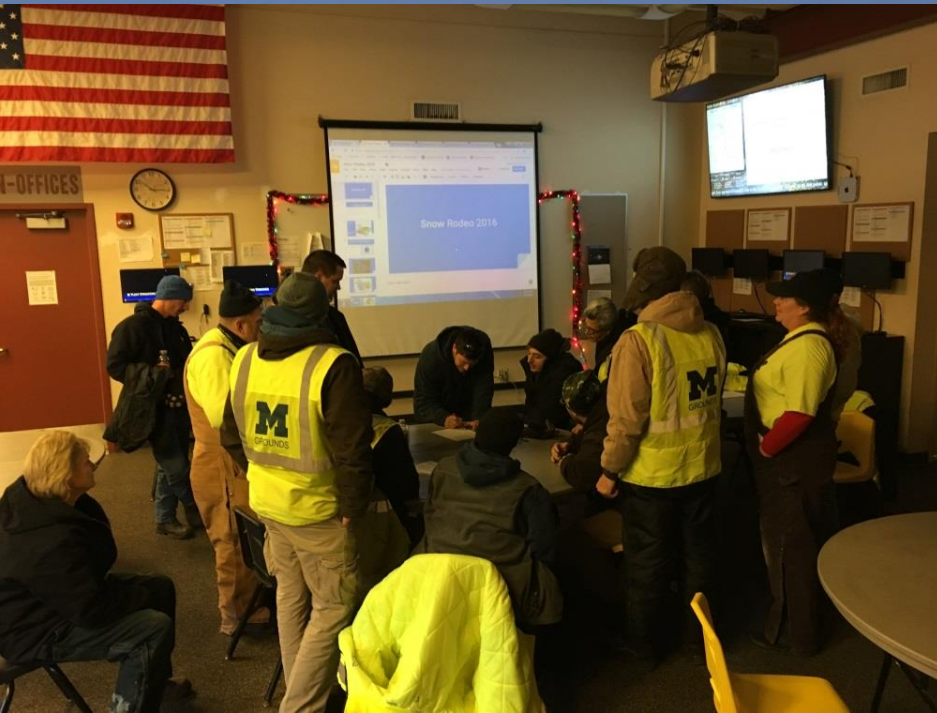
Equipment training consists of:

- 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
- Salting rate application test



Training - Snow Rodeo

Individual Winners receive a gift card

Winning Team gets a free lunch

Gift Card Winners



Medical Zone Team

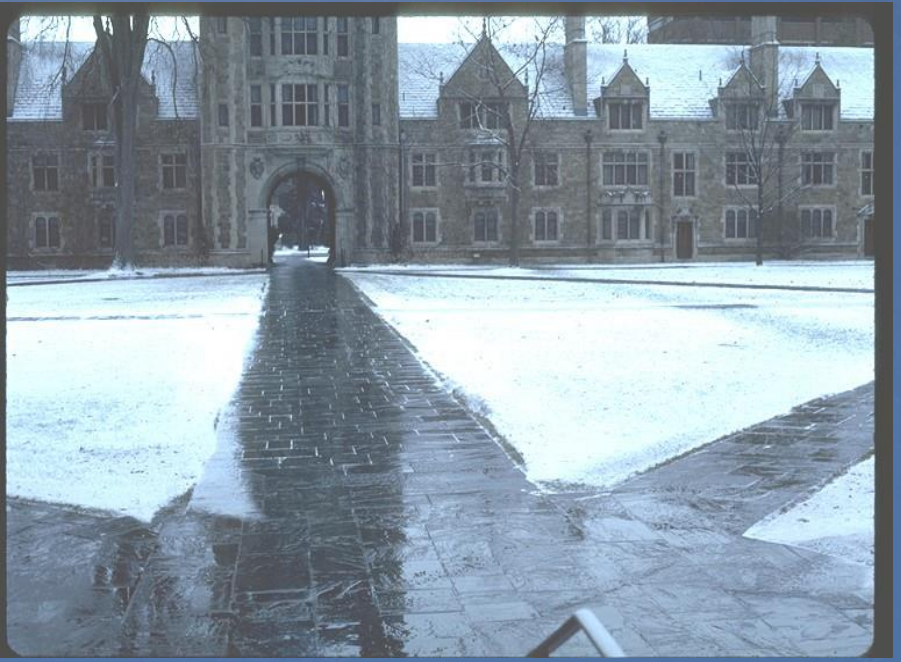


Best Management Practices for Sidewalks and Entryways

Mechanical Removal with Rotary Brooms, plows or shovels.

Anti-icing and De-icing using liquids

Eliminate melt and refreeze by placing the snow correctly



BMP - Brooming and Spraying with one pass



Melt and Refreeze areas



Why Liquid Deicers on Sidewalks ?

Increased Service levels

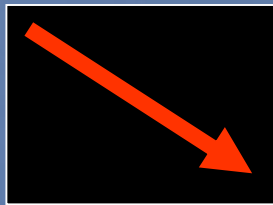
- Proactively anti-icing before the snow falls.
- Allows for easier and more thorough mechanical removal.
- Even distribution of deicer on walkways.

Protecting the environment and infrastructure

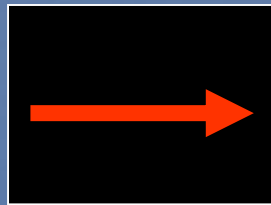
- Using the appropriate amount of deicer limits the amount that enters the environment and damages infrastructure.



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 color for visual appearance.

For Extreme cold situations: Magnesium Chloride

- Only used when temperatures are below zero and ice has formed.
- Good melting properties at low temperatures.
- Downside – can make smooth floors slippery

Non Chloride: Sodium Formate/Acetate blend

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

Parking Lots and Structures

Parking Services has 23 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

Materials Used:

- 14 Structures
 - 8 - Sodium Formate/Acetate blend
 - 6 are coated which allows the use of rock salt
- 200 Lots – Bulk Road Salt

50% of the surface lots are contracted

Challenging weather scenarios

Freezing rain - <https://spark.adobe.com/page/O8Ev9Uq0c2WZw/>

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...

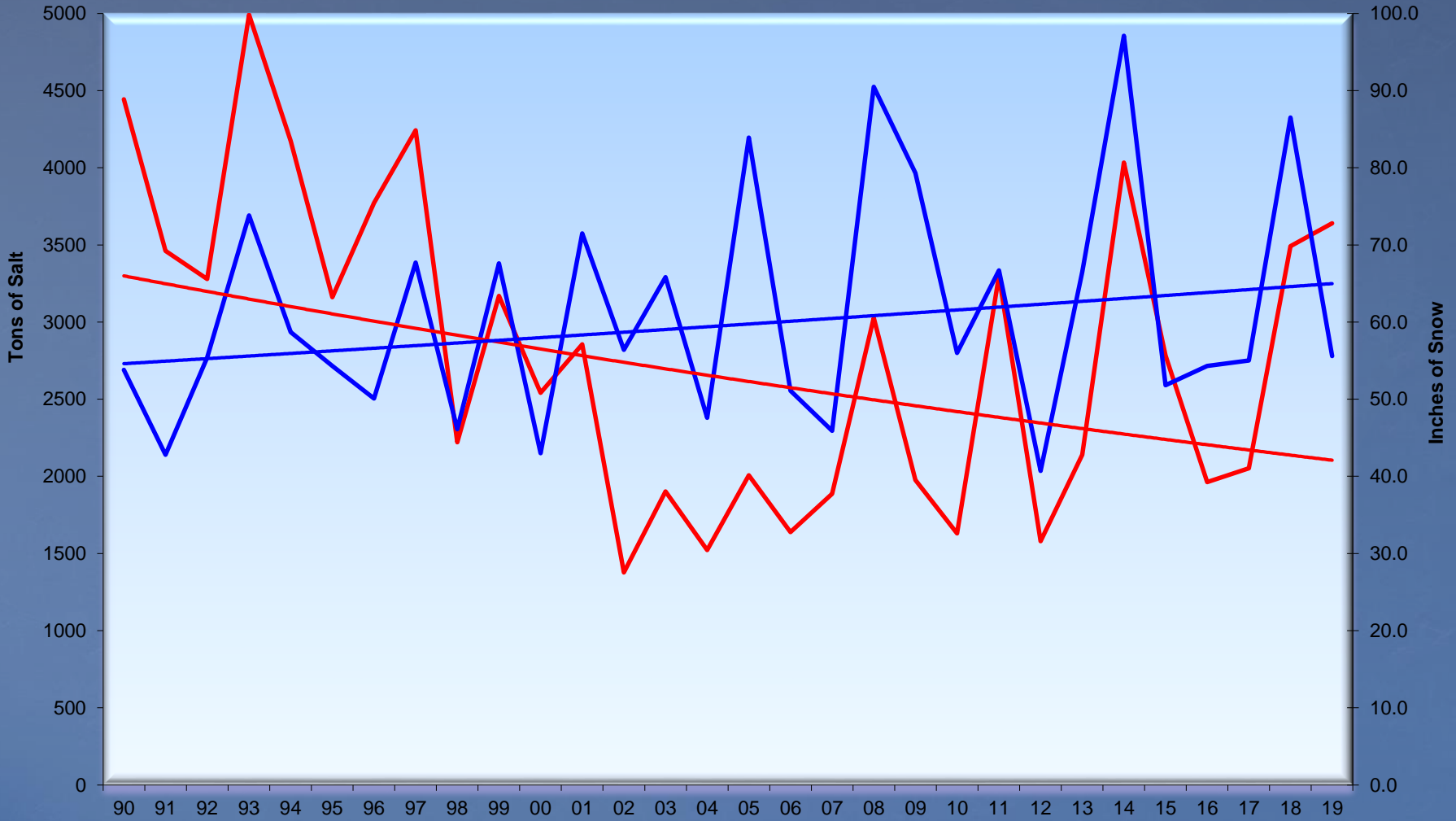
Early and late season snow events

- 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 compared to Inches of Snow



Questions ?



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