

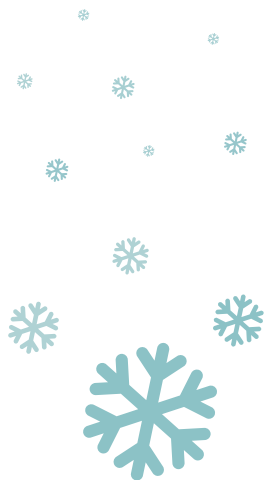


2014-15

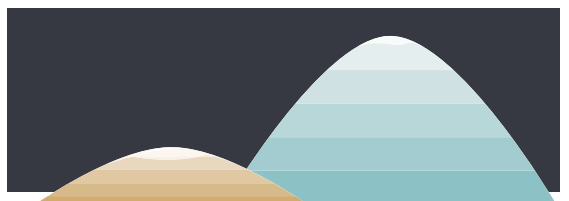
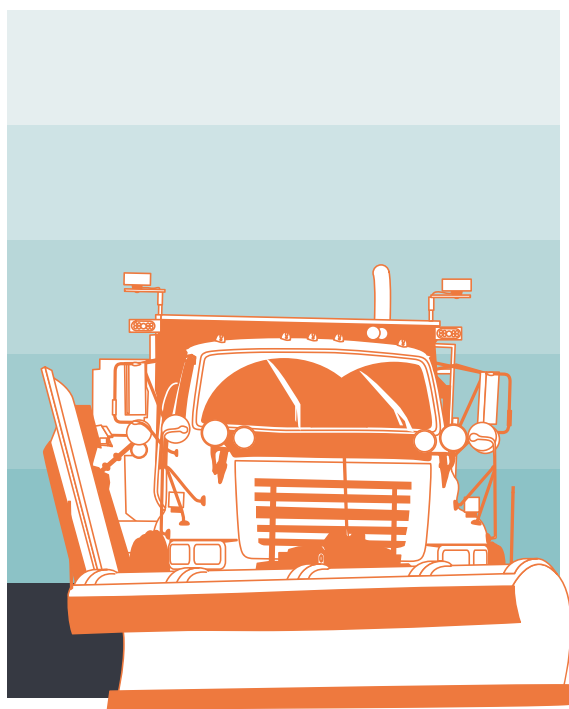
# Winter Maintenance Report

At A Glance

Total Cost of Winter  
**\$87.9 Million**



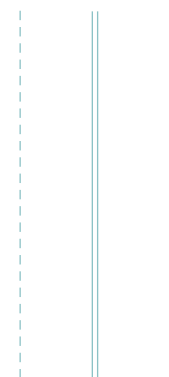
**39.4"**  
Statewide  
Snowfall  
Average



**40,000**  
Tons Sand

**174,000**  
Tons Salt

**30,546**  
Lane Miles



**87%**  
Frequency  
Achieving  
Bare Lanes

**1,514** Full-time  
**327** Backup  
**Drivers**

**839**  
**Plows**

**148**  
**Truck**  
**tations**

# Introduction

The 2014-15 winter was considered an average one in terms of few heavy and prolonged snow and ice events. MnDOT spent fewer dollars on snow and ice than 2013-14, but resources were still used for the 23 to 39 winter events (depending on the district). Whether the state gets a lot of snow and ice in a season or smaller amounts, resources are still expended to keep roads clear, pay wages and maintain equipment.

## Snapshot of winter: 2-year comparison

Category	Measure	2013-14	2014-15
Infrastructure	Lane Miles	30,597	30,546
Weather	Snowfall, MSP Airport	69.9"	32.6"
	Snowfall, statewide across districts	75.6"	39.4"
	Number of winter events, statewide average and range across districts	34	28
Materials	Salt used	275,857 tons	173,888 tons
	Average weighted cost of salt per ton	\$71.14	\$74.36
	Salt brine used	2.7 million gallons	2.2 million gallons
Costs and Performance	Total plowing, salting and sanding costs	\$136 million*	\$87.9 million*
	Total plowing, salting and sanding costs per lane mile, statewide average	\$4,435	\$2,878
	Frequency of achieving bare lane after winter event (70% target)	79%	87%
Labor and Services	Regular labor hours	718,591	501,095
	Overtime winter labor hours	222,624	94,461

*\*Based on fiscal year*

# Weather

The 2014-15 season snowfall, reported at the Minneapolis - St. Paul Airport, was 33 inches.

That compares to 70 inches in 2013-14.

The 10-year average season snowfall is 49 inches.

District 1 reported the most snowfall with 59 inches

at International Falls. The District 1 average was

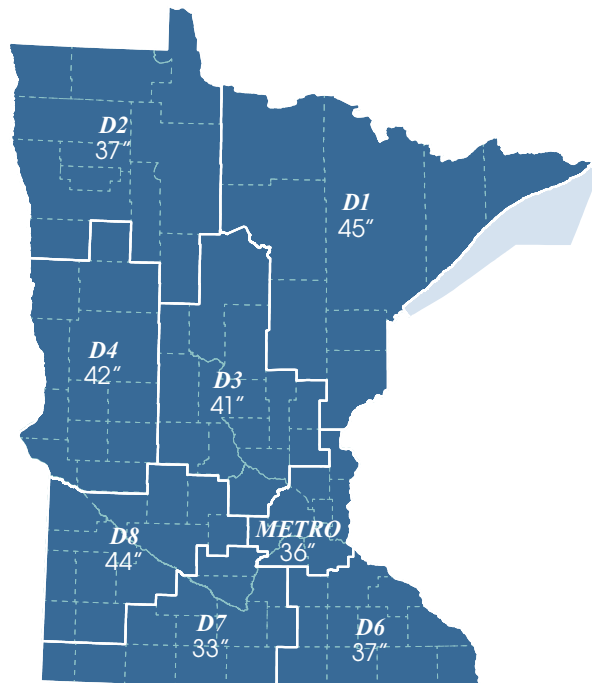
45 inches. District 8 reported the second highest

average with 44 inches. District snowfall levels are

determined by averaging measurements from four

locations within the district.

## 2014-2015 Average District Snowfall

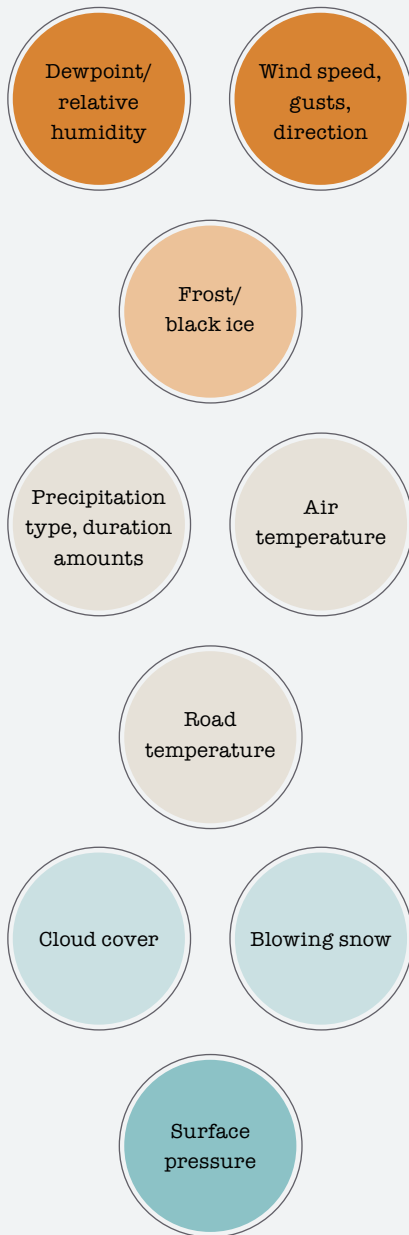


### **A winter event is....**

Any winter weather occurrence that consumes resources necessary to prevent, minimize or regain the loss of bare lanes. Winter events can include freezing rain, drizzle/sleet, snow, drifting/blowing snow, frost, ice/black ice, refreeze or any combination of these conditions.

## Winter Severity Index

MnDOT uses a Winter Severity Index to simplify the comparison of winter severity from year to year. At the end of each season, each district uses these factors to calculate a single relative number:



## Official weather reporting station snowfall

	<b>MSP Airport*</b>	<b>Statewide Average</b>
2010-11	86.6"	77.4"
2011-12	22.3"	29.5"
2012-13	67.7"	72.3"
2013-14	69.9"	75.6"
2014-15	32.6"	39.4"

\*The MSP Airport is the state's official weather station.

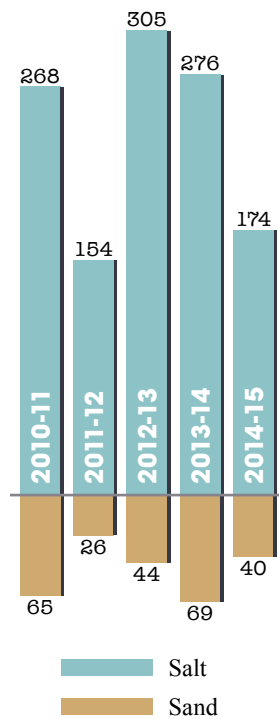


## Winter Severity Index by district for past 3 years

<b>District</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>
1	92	158	93
2	101	125	85
3	79	112	69
4	112	129	92
Metro	75	92	66
6	74	134	88
7	75	110	97
8	83	115	92
<b>Statewide</b>	<b>90</b>	<b>128</b>	<b>87</b>

# Materials usage

Salt and Sand  
(in thousands of tons)



2014-15 district by district average salt/sand usage for the past 5 years  
(in thousands of tons)

District	Material	2010-11	2011-12	2012-13	2013-14	2014-15
1	Salt	40.7	29.0	50.0	40.7	27.4
	Sand	23.4	7.6	14.0	23.4	11.7
2	Salt	9.8	12.0	16.9	9.8	12.6
	Sand	7.4	7.8	7.6	7.4	8.2
3	Salt	35.0	17.1	39.9	35	22.2
	Sand	3.9	8.4	3.0	3.9	1.5
4	Salt	11.4	10.1	22.0	11.4	11.1
	Sand	6.4	4.9	3.7	6.4	5.5
Metro	Salt	97.0	38.6	79.9	97	44.9
	Sand	7.3	0.1	1.0	7.3	1.1
6	Salt	43.0	24.1	49.7	43	30.5
	Sand	12.0	3.5	8.3	12.1	6.8
7	Salt	23.9	16.1	27.8	23.9	15.0
	Sand	1.8	0.2	1.4	1.8	0.6
8	Salt	14.9	6.7	17.4	14.9	10.3
	Sand	6.8	1.2	5.5	6.9	4.5
Statewide	Salt	267.8	154.1	304.6	275.9	173.9
	Sand	65.2	26.1	44.3	69.1	39.8

## Factors affecting use of material during winter event:

- Precipitation type
- Air Temperature
- Cloud cover
- Blowing snow
- Dew point/relative humidity
- Wind speed
- Road temperature
- Frost/black ice
- Surface pressure

## Variation in salt usage from district to district depends on:

- Winter severity
- Road classification
- Level of service
- Physical environment conditions


# Cost and performance of winter operations

Snow and ice expenditures were about 35 percent or \$48 million less than the previous winter. A total of \$87.9 million was spent on materials, labor and equipment. The severe winter of 2013-14 had MnDOT planning early for its 2014-15 salt supplies. MnDOT bought salt in the summer, so while other agencies might have paid record prices and experienced shortages, MnDOT bought at reasonable prices to get the best value possible. Corresponding with the less severe winter was the reduction in salt, sand and brine usage from the previous year.

## Salt costs\*

(cost per ton 5 year average)

2010-11	\$67.04
2011-12	\$70.51
2012-13	\$69.81
2013-14	\$71.14
2014-15	\$74.36



**\$7/ton**  
more than in 2010-11

\*Based on fiscal year

## Historical snow and ice expenditures trend\*\*

(costs in thousands)

Office	2010-11	2011-12	2012-13	2013-14	2014-15	5 Year Average
1	\$11,174	\$8,860	\$14,784	\$16,902	\$10,321	\$12,408
2	\$6,965	\$5,833	\$8,882	\$9,051	\$6,963	\$7,539
3	\$13,232	\$7,255	\$14,300	\$16,466	\$10,259	\$12,302
4	\$8,620	\$5,713	\$11,003	\$9,867	\$7,622	\$8,565
6	\$12,274	\$8,177	\$14,628	\$18,790	\$12,838	\$13,341
7	\$9,936	\$6,324	\$10,027	\$12,760	\$8,279	\$9,465
8	\$6,725	\$2,982	\$7,905	\$9,242	\$6,281	\$6,627
Metro	\$37,453	\$16,134	\$30,253	\$42,558	\$23,872	\$30,054
Maintenance	\$585	\$672	\$401	\$495	\$1,346	\$700
Other	\$117	\$33	\$96	\$98	\$126	\$94
Statewide	\$107,079	\$61,983	\$112,279	\$136,228	\$87,914	\$101,095



**\$13 million**  
less than 5 year average

\*\*Based on fiscal year



**Total spent for snow and ice control and winter severity**

*(cost in millions; includes materials, labor and equipment.)*

	<b>Cost</b>	<b>Severity</b>
2012-13	\$112	90
2013-14	\$136	128
2014-15	\$88	87

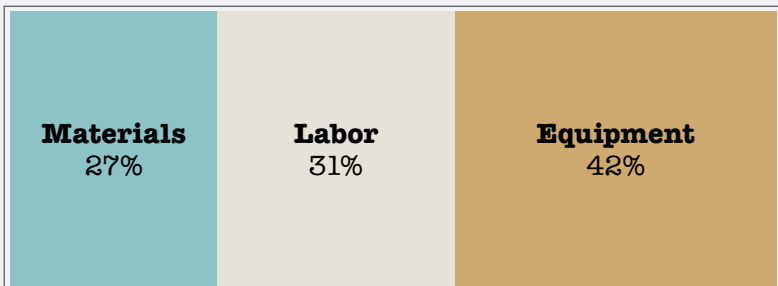
**\$48 million**  
less than 2013-14



**Factors affecting winter maintenance costs:**

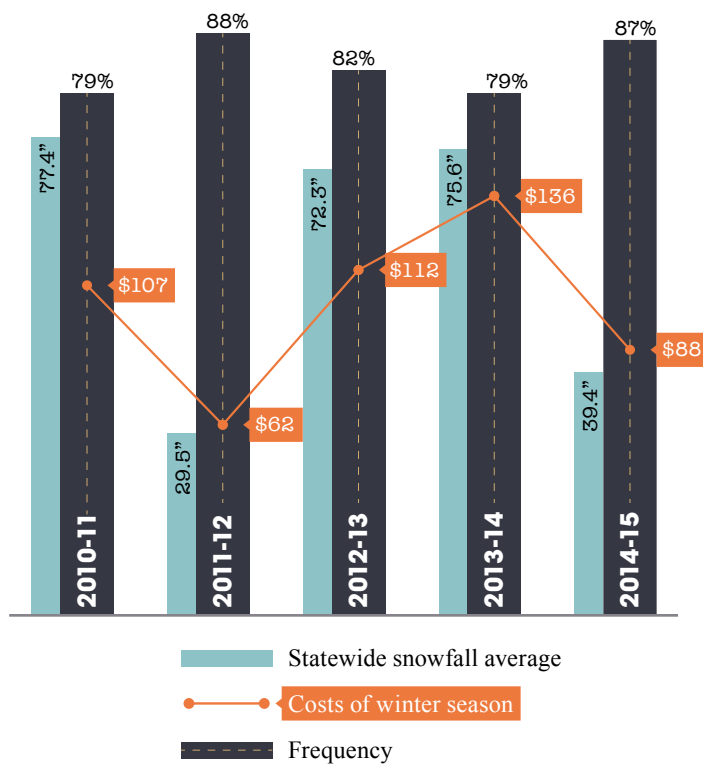
- Timing of storms
- Change in labor costs
- Inflation
- Fuel prices
- Salt, sand prices
- Winter severity index

**2014-15 winter costs by category**



# Bare Lane Targets

Frequency of meeting bare lane targets  
(cost in millions)



## Meeting bare lane targets

MnDOT met its overall performance target for the season. The statewide average for meeting this target for all road classifications was 87 percent. MnDOT met or exceeded the 70 percent target the past nine out of 10 years. MnDOT worked to reduce chemicals used on roadways and invested in updates to systems and technologies.

**Bare lane regain time** - This is measured from the time a winter event ends to when MnDOT's snow and ice operations regain bare-lane driving conditions. The target for this measure varies by road classification, ranging from 0 to 3 hours for the state's most heavily traveled roadways to 9 to 36 hours for the least traveled secondary roads.

## Frequency of meeting bare lane target -

This measure reports how often crews met the bare-lane target over an entire winter season. This target is set at 70 percent.