

AASHTO 2014-15 Winter Survey Summary		
Question 1 - What States replied		
1	Arkansas	
2	Colorado	the data below represents resources used from October 8, 2014 to March 17, 2015.
3	Connecticut	
4	Indiana	
5	Kansas	
6	Kentucky	
7	Louisiana DOT	
8	Maryland	
9	Massachusetts	
10	Michigan DOT	
11	Mississippi	
12	Missouri	
13	Montana	
14	Nebraska	
15	New Hampshire	
16	New York State	
17	Ohio	
18	Pennsylvania	
19	South Dakota	
20	Utah	
21	Vermont	
22	Washington State	
23	Wyoming	

AASHTO 2014-15 Winter Survey Summary		
Q2 How bad was the winter for your state?		
	a. Was this winter harder – about average – or lighter than normal?	b. How do you measure the severity of winter storms (total inches of snow, number of storms, or a winter severity index)? What is this years measure and how does it compare to previous years?
Arkansas	Harder Than Average	Frequency and amount of frozen precipitation
Colorado	We are at the start of our two highest snow months (March/April). About Average	Currently by storm event.
Connecticut	Colder and more Active than usual. Harder	Connecticut does not have a winter severity index. However, we had 12 storms in 4 weeks. February averaged 13F below normal.
Indiana	This winter has been lighter than normal.	INDOT currently tracks the hours of precipitation below 35 degrees from selected weather stations, primarily airports. On average across the state, Indiana saw 170.4 such hours this winter through March 14. The annual average is 213.5 hours, so this winter has been lighter than normal.
Kansas	It was About Average	We measure with cost.
Kentucky	Earlier than average snow event (November), a period of below average snowfall, then 2nd half of February through 1st week of March well above average snowfall.	Typically by the number of measurable events and seasonal costs.
Louisiana	A little more active than normal. February was much colder than normal.	Number of events statewide and pounds of salt used. 5 events last year and around 500,000LBS of salt compared to 3 events this year and around 300,000LBS of salt.
Maryland	Mildly Severe. This winter was harder than normal, with 67% increase in events with frozen precipitation over our 14 year average.	Measurements include: Total average inches of snow, number of storms with frozen precipitation, time to bare pavement, Salt used at lbs per lane mile per inch. This year's winter numbers were as follows: A 35% increase in total average inches of snow over our 14 year average. A 67% increase in events with frozen precipitation over our 14 year average. Our time to bare pavement LOS threshold is 4 hours and we completed this task in an average of 2.54 hours. A reduction in salt used at 3% under our 14 year average.

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Massachusetts	harder	<p>total inches of snow-</p> <ul style="list-style-type: none"> • Historic Winter Season • Boston area’s snowiest winter, 110.6” (average 42.9”, last year 58.6”) • 2 of the top ten storms of all time (recorded) • 43 consecutive days the temperature did not go above 40, a new record • Worcester area’s third snowiest winter, 119.7” (average 62.6”, last Year 84.6”) <p>number of storms = 31</p> <p>Winter Severity Index: We have not fdone the calculations yet it is based on the entire season using data from different parts of the state</p>
Michigan	It has been about average overall. (Last winter was the worst in a couple of decades)	We use a winter severity index in some areas and are in the process of working toward doing this statewide. Currently we look more at the budget and material usage to gauge how bad the winter has been.
Mississippi	Harder. We had 2 major ice and snow events that effected up to or exceeding half of the state. There were a couple of other minor, short-term winter precipitation events that effected northern districts.	We use no know metric for overall severity as conditions across the state can vary greatly. The severity is gauged mainly by number of major storms and dollars spent after the fact. This was relatively equivalent to last year yet both years are above average from roughly the previous 5 years.
Missouri	Lighter than normal	Total inches of snow, number of events and winter operations costs are the measures we commonly refer to, however we are doing some work with the Winter Severity Index provided by the Aurora Pooled Fund study.
Montana	Slightly below average, season not completed yet. See information provide in #3. Lighter than normal.	The Montana Department of Transportation does not manage a winter severity index; however we track labor, equipment and materials as well as the number of miles plowed/treated throughout the season. Comparing accomplishment from season to season is how we measure winter severity.
Nebraska	Average	Total inches of snowfall. In the west end of the state their snowfall to date is approximately 54” and the east end of the states received 21”

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New Hampshire	Harder. 3rd Worst Winter Since 1970 In Both Winter Severity As Well As Snow Depth. To Date Have Had 2 Ft More Than Avg Snowfall	3rd Worst Since 1970 (That Is Where I Have Data Back To) Month Of February Was Worst Month Since Records Started In 1970.
New York State	Harder than average. Combination of all to some extent, but also materials use and overtime	This year was similar to last year, both of which were above average.
Ohio	Harder, Direct cost toward snow and ice removal.	This has been the most costly snow and ice season in the past ten years. As of April 1 st we have spent over \$120,000,000 on snow and ice removal operations
Pennsylvania	Above Average	Budgetary Impact
South Dakota	Lighter than normal	We have used all the above in the past, but are migrating to using the winter severity index. Numbers are not complete for this year.
Utah	Very Mild. Very Light	We are in the process of developing a winter severity index that will be live next year.
Vermont	Colder, windier, and snowier than normal. Harder	We are still working on a method for establishing winter severity – via a winter severity index - that we can feel good about sharing. In the past we measure number of “responses” to winter events, i.e, number of days spent doing winter maintenance. Last year was one of the worst on record. This year we’ve had fewer events (but we’re close) and we’ve spend more money and used more salt, largely due to the cold temps and wind.
Washington State	Extremely mild.....most of our mountain passes have experienced historically low levels of snow fall while reaching or exceeding total precipitation levels.	We use a combination of snow fall and frost index. We are currently experiencing the 2 nd or 3 rd lowest snow fall for mountain passes since we began recording. Frost index is 7 th lowest in 24 years or approximately 10%

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Wyoming	This winter has been milder than normal looking at the state over all	<p>Officially WYDOT does not measure winter storms. WYDOT is working with Day Weather and a Performance Measures Committee to determine if the Local Weather Storm Severity (LWSS) algorithm is applicable for Wyoming. The meteorologist for Day Weather has modified some of the key factors to reflect Wyoming's storm events more accurately. In 2015 the storm events have been mild on a 5 point scale (5 being the highest). This is also an individual storm event scale.</p> <p>The biggest measure is our Snow Removal Budget. Last year the budget was \$6M short, and this year we are either in an under run or holding the line mode. That means a light winter season. The Performance Measures Committee is looking to see if the LWSS for individual storms can be combined in a manner that will provide an accurate or believable winter severity value. At this point we have only three seasons worth of data to make any comparisons with. To small of a data set.</p>

AASHTO 2014-15 Winter Survey Summary				
3) How much resource did you consume this winter?				
	a. How many tons of salt, sand, brine was used in winter operations?	b. How many operators including contractors were used in winter operations?	c. How many man-hours were expended on winter operations?	d. Did you share resources with other states or local agencies?
Arkansas	44,438 Tons of rock salt 216,000 gallons of Beet Juice Approx 500,000 gallon Brine	Approximately 1500 to 2000	No Reponse	None
Colorado	Salt 50,000 Tons - Sand 868 Tons - Salt/Sand mix 10,739 Tons – Brine 592,282 Gals. – Sand/Ice slicer mix 161,478 Tons - Other Liquid deicers 7,768,000 Gals. – Sand/Ice slicer/pre-wetted 2700 Tons	Approximately 1500	435,109 Hours	No, not at this time
Connecticut	211,816.21 Tons of Salt 1,296,500.70 Gallons of Magnesium Chloride Fuel has not been compiled	1100 DOT, 250 contractor	206,426.10 Regular hours 276,524.80 OT hours	No
Indiana	As of March 14, INDOT has deployed 273,154 tons of salt and 4,947,143 gallons of brine.	INDOT had 1,712 plow drivers available for 910 snow routes.	308,083 as of March 14	No, local agencies may purchase road salt through the state's annual contract through the Indiana Department of Administration.
Kansas	Salt= 68,944 tons Sand= 39,950 tons Brine= 3.8 million gallons	Approx. 1400	150,000 hours of treating and plowing	No
Kentucky	Salt - 288,423 tons Salt Brine - 2,383,160 gallons CaCl - 971,320 gallons	Approximately 1800 KYTC operators and 800 contract drivers	Not yet known	Not of any significance
Louisiana	300,000LBS of salt	Approximately 220	22,000	No
Maryland	Salt 337,492 Tons Brine 1,360,635 Gallons	639 State and 1708 Contract (Trucks and Loaders)	Routine Hours 143,868, Overtime Hours 263,859.08, Total 407,727.08	Yes, SHA has multiple Salt MOU's with local agencies in each District. As resources became scarce and we had to plan for internal movement of salt so SHA scaled way back on these allowances.
Massachusetts	600,000 tons of salt use 1,600,000 Gallons of liquid deicer used	4400	296,000 (employees only)	Yes <ul style="list-style-type: none"> • MassDOT provided equipment and personnel to assist 29 cities and towns with snow and ice debris removal. • MassDOT supported the MEMA staging areas for out-of-state crews. • MassDOT loaned salt/materials to agencies, cities and towns (19)

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Michigan	Winter is not done, I would estimate maybe 400,000 tons of salt. Sand usage is limited and I don't have a quantity. I would estimate about 2,500,000 gallons of brine to date	I would estimate about 1,600 total	I estimate about 320,000 man hours to date	Yes but on a limited basis...usually salt.
Mississippi	Bulk Salt (TON): 810 Bag Salt (TON): 77 Sand/Slag (TON): 300 Brine (GAL): 110,300 Liquid Magnesium (GAL): 2,500 Calcium Chloride (GAL): 1,720	6,470 Man Days. No contract work was utilized.	64,704 Man-hours	This was not requested, but we would have been willing to accommodate should the situation have presented itself.
Missouri	Salt about 110,000 tons Sand and other abrasives about 80,000 tons Brine about 3 million gallons	We use about 3500 operators	About 525,000 hours	No
Montana	Straight Salt - 2970.5 tons Salt / Sand - 135,375 cubic yards Salt Brine - 4,763,959 gallons Mag Chloride - 1,804,888 gallons	562 – Permanent 227 Temporaries	55,522	Not often.
Nebraska	Approximately 85,000 tons of salt, 2 million gallons of various liquid de-icing materials (this does not include salt brine as I do not have those figures readily available)	900	157,133	No
New Hampshire	190,000 Tons Salt And Counting	1,000	Do Not Have This # But In Fy 14 We Plowed 2,389,000 Miles And In Fy 15 To Date We Are At 2,505,000 Miles. Fy 14 Was A Tough Year Too.	No, Except Clearing Snow From The Beach Parking Lots.
New York State	Approx 1.1 million tons of salt minimal sand 750k-1.0 mil gallons of salt brine.	3790 S&I Field Staff we do utilize 162 municipal contractors (e.g. counties, towns) to conduct S&I operations on specific state highways; no private contractors are utilized.	No Response	We occasionally provide out of state support for declared emergencies, for example resources were sent to assist Massachusetts this winter. Local agency support usually follows Governor's declared emergencies; such support includes snow and ice operations, snow blowing, materials lending.

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Ohio	We used 947,247 tons of salt and over 8 million gallons of brine	We used 2,690 full time, auxiliary and seasonal operators during snow and ice operations. ODOT does not use contractors for winter operations.	1,141,520 labor hours were used.	No, but we do sell brine to some of the local agencies that do not have their own brine makers.
Pennsylvania	Salt = 1 Million tons Salt Brine = 10 Million Gallons Anti-Skid = 500K Tons	4,500 Dept Operators 300 Rental Trucks	2.5 Million Man-Hours	Yes, Municipal Governments
South Dakota	Mag Chloride – 229,821 gals Salt Brine – 761,847 gals Salt – 5,869 tons Sand - 740 tons	426	91,749 man-hours to date	Some
Utah	Salt 202,825 tons Sand 564 tons Brine 2,101,661 Gallons Mag 34,185 Gallons	no response	313,324	Not that I am aware of
Vermont	118,000 tons of salt and 2 million gallons of brine to date (3/10/15)	We have 250 plow trucks, 25 spares, and about 375 licensed drivers (which includes our spare drivers like mechanics and stock clerks)	231,000 hours to date (3/10/15)	Nothing worth reporting (a few small handshake agreements with towns for a load of salt or borrowing a loader, etc.)
Washington State	Quantities below are as of the end of January, 2015 Solid Deicer: 129,120 tons of salt Sand: 80,408 tons Salt/Sand Mix: 42,604 tons Liquid: 14,419 tons	No winter contractors were used. FTE equivalent related to winter operations average around 500 in our peak winter months of November-Feb, 2015.	287,031 hours during the months of Sept-Jan	No significant resource sharing this year.
Wyoming	Aggregate, Salt Mix: 177,550.85(tons) Sodium Chloride, Bulk: 1,099.57(tons) Aggregate, Salt Mix, Modified: 1,037.80(tons) Ice Slicer 3,818.97 (tons) Salt Brine: 792,945.64(gallons) Apex/Caliber/Magnesium Chloride:192,647.20 (gallons) Geomelt: 7,695.00(gallons) GeoBrine: 237,705.00 (gallons)	500	221,480	No

AASHTO 2014-15 Winter Survey Summary		
4) Budget impacts		
	a. How much money was spent on manpower, materials, and equipment for winter operations?	b. What percentage of your maintenance budget does this winter's efforts represent.
Arkansas	\$14,950,000	6.80%
Colorado	Manpower- \$13,856,661 Million Materials - \$22,879,733 Million Equipment - \$12,748 Services - \$ 75,464	Approximately 25%, of our maintenance budger.
Connecticut	\$44,634,739	33% of the maintenance budget
Indiana	As of March 14, INDOT estimates it used approximately \$40 million in operational resources this winter.	Anti-icing materials make up about 26 percent of INDOT's maintenance budget this year. Equipment and labor expenses are tracked separately from INDOT's maintenance budget.
Kansas	\$14.6 million	About 11%
Kentucky	\$40.9 million	Approximately 16%
Louisiana	\$1.2 Million	1%
Maryland	Manpower - 23.6 million Materials – 33.1 Equipment – 11.7 million Hired Contractor Equipment – 39.7 million Total – 108.1 million	SHA allocates approximately 32% of its maintenance budget for winter operations.
Massachusetts	Actual YTD Expenditures Hired Equipment = \$98,326,667 Snow & Ice Control Materials = \$37,011,679 Vehicle Repairs = \$1,482,168 Total Salary cost through 3/21/15 = \$16,875,752 Total cost=\$153,696,266	Snow and Ice is a separate fund from our normal winter Maintenance
Michigan	To date estimate about \$80,000,000	About 30%
Mississippi	\$3,130,258	2.80%

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	a. How much money was spent on manpower, materials, and equipment for winter operations?	b. What percentage of your maintenance budget does this winter's efforts represent.
Missouri	Labor \$13M Materials \$9M Equipment \$10M	8% this year, averages about 12%
Montana	These numbers provided are through February 20, 2015 Labor - \$5,698,933.07 Equipment - \$3,726,080.37 Materials - \$7,667,787.77 Total Cost - \$17,116,801.21, 5 year average = \$22,163,759 Miles plowed – 2,351,574, 5 year average = 3,494,646	Roughly 18% through reporting period
Nebraska	\$22.2 million	15%
New Hampshire	Currently \$46M, Or 108% Of What We Had Budgeted	About 55% For Highway Maintenance
New York State	No Response	No Response
Ohio	\$120,289,512 was the total spent on manpower, materials and equipment for winter operations.	No Response (Sam, do you know this figure?)
Pennsylvania	\$204 Million to-date	Appox 20%
South Dakota	Manpower – \$2.36 million Equipment - \$5.41 million Materials - \$3.32 million	20%
Utah	Labor-\$5,294,437 Equipment-\$4,500,550 Materials-\$4,280,601	About 60%
Vermont	\$26.7 million to date (3/10/15)	Roughly 35 – 40%

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Washington State	In general we have spent Labor (regular time is a fixed cost, typically we look at O.T. as a more accurate indicator of actual winter cost, in a winter such as this our crews are doing other critical activities due to low snow and ice needs): \$10,277,349 Equipment: (This is a fixed cost) \$6,610,142 Materials: \$6,364,915 Other: \$819,613	11.42% of the total annual maintenance budget as of end of Jan. 2015.
Wyoming	Labor Costs: 6,545,112 Material Costs: 5,648,263 Equipment Costs: 6,014,168 Other Costs: 165,996 Total: 18,373,541	18.90%

AASHTO 2014-15 Winter Survey Summary		
5) Winters impact on other maintenance activities		
	a. Do you expect to see greater than normal damage to your roadways as a result of this past winter?	b. Are there any specific maintenance activities (routine or otherwise) that might be affected?
Arkansas	Yes	Surface repairs
Colorado	Possible, because we didn't get our normal cold weather in December and January the snows have had more moisture content. This could cause more potholes than we normally experience at this time of the year.	Pot hole repair, guard rail impacts, and sign damage
Connecticut	Yes, water damage, cracking and frost heaves	Pothole patching and Overlay projects
Indiana	This past winter was fairly typical with what we could expect with road damage. This year will be less than the damage Indiana experienced during the 2013-14 winter.	Due to significant increases in salt prices, some maintenance work was deferred from 2014 to 2015 in case the extra funds were needed. It appears that most of the work will be completed within the same fiscal year.
Kansas	No	No
Kentucky	Yes, with periods of below normal temps, heaving and later in season with high water issues following heavy snows.	Pot hole patching, guardrail replacement, sections of roadways replaced with slides and washouts.
Louisiana	No	No
Maryland	Yes, we have already begun to see multiple road surfaces with major deterioration.	Yes as we have been experiencing a large increase in potholes across the state. To date this fiscal year we have spent 600,000 dollars more on pothole repairs than our 3 year average.
Massachusetts	YES	More pot holes More Gaurdrail repair More Sign Repair Delayed start to litter cleanup
Michigan	Yes mostly due to our overall system being in decline due to insufficient funding.	MDOT has about 300 and our contract counties have about 1,200 total. MDOT does about 25% of statewide maintenance with State forces and contracts out the rest to mostly County Road Commissions.

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Mississippi	Due to the increased amount of plowing from the heavy snow events and freeze thaw cycling from ice events, we have seen increased potholing which is normal for the type of circumstances.	Pothole patching, raised pavement marker replacement and striping may be increased when winter breaks and annual work plans are set.
Missouri	No	No
Montana	No	No
Nebraska	No	No
New Hampshire	The Severe Cold Has Left Many Roads In Tough Shape. Potholes Are About Normal But The Spring Rains Have Not Yet Arrived.	Fortunately In Nh We Have A Winter Budget And A Summer Budget That Are Separate. This Only Came About In The Last Budget Cycle.
New York State	Pothole patching activities this winter are already equal to the elevated levels of last winter.	Undetermined at this point.
Ohio	Yes	Yes
Pennsylvania	Yes, damage is obvious in many locations already.	Additional clean-up at the end of the season. Due to temperatures being well below average we were unable to perform some routine winter maintenance activities (i.e. ditching, tree trimming, etc.) Budget impact may result in the delay of some projects.
South Dakota	No	None that I'm aware of.
Utah	With such a mild winter we have been able to continue crack sealing and other non snow activities for most of the winter. No	No Response
Vermont	We expect to, and that scenario is just starting to play out as this is the first week we've had above freezing in quite a few months.	Certainly expect to be doing a lot more patching this year. Extreme frost depths this winter (reported up to 7 feet in some spots) have also caused issues with water lines, and we had one garage septic tank freeze (6" of ice inside the tank).

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Washington State	None, in fact due to the light winter we have been able to accomplish a number of tasks that we did not plan to accomplish.	Yes, positively impacted include ditching, vegetation obstruction, guardrail to mention a few. In other words we were able to do more of these activities with existing staff because we had less snow and ice control work than planned.
Wyoming	No	We are currently under running snow control expenditures due to the lighter winter. If this continues we may be able to use excess funds for additional surfacing work to help with our current backlog

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6) How big is your winter maintenance fleet of snowplows?		
Arkansas	Approximately 700 pieces of equipment total, spreaders, plows, patrols, pickup truck mounted spreaders, etc...	700
Colorado	810 snowplow units and 10 tankers with liquid spray bars/tractors	810
Connecticut	632 State truck and 224 Contractors	876
Indiana	1,070 trucks with snow plows and an additional 7 trucks with two-lane "tow plows".	1077
Kansas	591 dump trucks	591
Kentucky	980 KYTC trucks and 395 contract plow trucks.	1375
Louisiana	N/A	
Maryland	639 State and 1568 Contract Trucks with plowing capabilities	2207
Massachusetts	4000 + (Contractor and DOT equipment)	4000
Michigan	MDOT has about 300 and our contract counties have about 1,200 total. MDOT does about 25% of statewide maintenance with State forces and contracts out the rest to mostly County Road Commissions.	1500
Mississippi	60 plow units statewide (more than half in the Northern 2 Districts) that are attached to single or tandem axle dump truck. Motorgraders are also occasionally used in extreme conditions if necessary.	60
Missouri	1550 snowplow trucks	1550
Montana	619	619
Nebraska	700	700
New Hampshire	350 State, 430 Hired	780
New York State	1,444 plow trucks	1444
Ohio	1,628	1628
Pennsylvania	2,252 Department Dump Trucks (single, tandem, tri-axel)	2252
South Dakota	435 plow trucks	435
Utah	We have 423 Plow Trucks, 193 Wing Plow Attachments and 10 Tow Plows	433
Vermont	250 active plow trucks plus 25 spare plow trucks.	275
Washington State	495 Plow Trucks	495
Wyoming	425 snow plows	425
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