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Washington	- Budget approximately $75-80M annually - Maintains 18,600 lane miles - Fleet of 500 plow trucks - 1,110 full-time employees and 166 seasonal/part-time employees - Geography ranges from temperate rain forests near the coast, high mountain passes in the Cascades, desert like Central Washington plateaus, and the rolling wheat fields of the Eastern Washington Palouse	Level of Service	Treatment level goals 1-5 are established for all routes within a region. Level 1 is the highest with instructions for treatment pre-event, during event and post-event. The Snow and Ice Plan contains maps illustrating treatment level goals for each route within a region. Following treatment, level of service is measured in terms of the resulting impact on road surface conditions and in terms of the impact on travelers.	Level of service targets: - LOS A to B: Snow or ice buildup encountered rarely. Bare pavement attained as soon as possible. Travel delays rarely experienced. - LOS B to C: Snow or ice buildup encountered at times but infrequent. Travel at times may experience some isolated delays with roads having patches of black ice, slush, or packed snow. - LOS C to D: Snow or ice buildup encountered regularly. Travel likely to experience some delays with roads having black ice or packed snow with only the wheel track bare. - LOS D to F: Compact snow buildup encountered regularly. Traveler will experience delays and slow travel.	- Field inspection	- Highway Activities Tracking System (HATS) is the platform staff use for recording level of service entries, whether or not trucks are equipped with AVL systems. Trucks equipped with AVL systems do not automatically gather the information needed to determine level of service.	Performance is measured in terms of sanding/deicing operations. The measured result is the condition of the travel lanes provided by these operations in response to winter weather events (i.e. snow, ice, frost). Measurement of these conditions is used to determine the level of service provided by the maintenance program throughout the winter season. Road surface conditions are assessed by staff after sanding or deicing activities occur. Assessment and documentation should be made after the activity is completed and the outcome (i.e. bare pavement, wheel tracks bare, etc.) is known. Maintenance personnel conduct the road condition assessments by observing the surface condition of a roadway (all lanes, both directions). Observations are documented in HATS. The minimum requirement is the completion of one level of service rating form per shift, when there is some kind of a measurable condition.	The Maintenance Accountability Process (MAP) is used to evaluate level of service, outline data collection processes used to record all sand, solid and liquid deicer applications, and describe the weather forecasting services provided to WSDOT. The Snow and Ice program is funded and equipped based primarily on historical records and the average winter conditions collected and compared over time. When occasional extreme winter weather occurs, the program cannot provide the accustomed level of service because existing resources are insufficient for this type of event. Since these types of events happen infrequently, it would be inefficient management of resources to size and base a winter maintenance program for the exceptional winter weather event.	- Maintenance Performance Measures - MAP Level of Service Definitions - 2015-2017 MAP Targets - MAP Manual - 2015-2016 Snow and Ice Plan
Idaho	- Budget $26 million annually - Maintain 12,000 lane miles - 512 full-time staff - Fleet of 500 plus vehicles - Diverse geography ranging from high desert to mountainous terrain	Winter Performance Index	Derived using a two step process starting with the Storm Severity Index that uses sensor data (wind speed, surface precipitation layers and surface temperatures) inserted into a formula to calculate an index value. The Storm Severity Index value is then inserted into a formula along with the ice-up duration to establish the Winter Performance Index.	The goal is to have a Winter Performance Index of 0.20 or less.	- WS=wind speed (mph) - WEL=water equivalent layer (millimeters) - ST=surface temperature (degrees F) - Ice-Up Time=when grip is below 0.6 for at least a 30-minute period (hours); grip measures how quickly the snow/ice surface was reduced and good traction (grip) surface restored	- RWIS for roadway data; TAMS currently for resource data; in process of switching to WARS (Winter Automated Reporting System) for more integrated resource tracking	The index value is then compared with a performance scale (typically 0.00 to 0.70 with a goal of 0.20 or less). Calculations are automated and done through the RWIS program visualization application - Navigator II.	Used to identify how successful the road treatment and timing were by the field maintenance personnel.	- Development of Winter Maintenance Performance Measures - paper from ITS World Congress (2013)
Idaho		Winter Mobility Index	Derived using the percentage of time the road conditions did not significantly impede mobility during a storm event (safe grip value of 0.6 or higher) when precipitation was on the surface with below freezing surface temperatures being observed.	Range from 0-1.00 with baseline of 0.60 (60%) from winter 2010-11	- Grip value: Calculated from surface precipitation and surface temperature in relation to storm severity index; values at .82 indicate dry, .60 indicates slush, and less than .60 indicates adverse condition - Surface precipitation - Surface temperature	- RWIS for roadway data	Results are compared from year to year vs. district to district and by trends vs. absolute values. Calculations are automated and done through the RWIS program visualization application - Navigator II.	Used to quantify storm event severity and index the response into a measurable efficiency for the district to make adjustments in winter operations that were not previously recognizable or quantifiable. Pay by performance has also been recently added to a new Transportation Technician Operator (TTO) series which allows staff to progress along three additional levels of expertise based on how frequently they achieve performance goals in comparison to resource consumption. Their first year was very successful with over 20% of employees receiving a pay increase in July 2015 and over 70% completing step 1 and going on to work on step 2 this year. ITD has also achieved a gradual increase in the percent of time highways were clear of snow and ice during winter storms – from 28% in 2010-11 to 79% in 2015-16.	- Development of Winter Maintenance Performance Measures - paper from ITS World Congress (2013) - Department Memorandum Regarding TTO Requirements for 2016 - Transportation Technician Operations (TTO) Step Pay Program Policy

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Montana	- Budget $25 million annually - Maintain 25,000 lane miles - 700 maintenance personnel - Fleet of 597 snowplows - Geography can be divided into two general areas. The eastern 3/5 of Montana is covered by the Great Plains and the western 2/5 of Montana is the Rocky Mountain Region.	Winter Maintenance Service Level Guidelines	MDT removes snow and ice and applies abrasives and chemicals to the roadway to improve driving conditions. The Department has established Winter Maintenance Service Level Guidelines to provide uniform service levels between maintenance areas throughout the state and provide better allocation of resources. During the unusual or extreme winter conditions, normal services will be provided as soon as available resources permit.	Six levels of service have been established to provide guidelines for uniform services and information to the public during a normal winter. **Level I (Urban):** Roadways within a 3 mile radius to towns or cities with an ADT greater than 5,000. Primary objective is to keep at least one travel lane in each direction open to traffic and to provide intermittently bare pavement as soon as possible. **Level I-A:** All interstate and other roadways with ADT greater than 3,000. Primary objective is to keep the roadway open to traffic and provide an intermittent bare pavement surface in the main driving lane as soon as possible. **Level II:** Roadways with ADT of 1,000-3,000. Primary objective is to keep one lane in each direction open to traffic. Snow packed and/or icy surfaces are acceptable but they may be treated with abrasives or chemical combinations. **Level III:** Roadways with an ADT of 200-1,000. Snow packed and/or icy surfaces are acceptable for Level III roadways. **Level IV:** Roadways with ADT less than 200 vehicles. These roadways may be closed for an extended period of time until resources are available to plow the traveled way. **Level V:** Seasonal roadways that receive no scheduled winter maintenance activities.	Maintenance patrolling observations. Patrolling the roadways is performed to check winter roadway conditions, determine maintenance needs and report conditions.	- Maintenance staff - RWIS - Weather forecasts	Operational treatments are continuously evaluated by MDT before, during and after a winter weather storm. Road treatments and applications are modified through all phases of a storm based on careful analysis of intensity, duration, and type of precipitation.	Level of service is used to provide a uniform service between maintenance areas and better allocation of resources. Factors considered when establishing the level of service for a specific route: - Safety and accident reduction - Average Daily Traffic (ADT) - Commuter routes - School bus routes - Availability of alternate routes - Public interest and concern - Potential economic impact - Consequence of not providing higher level of service - Available manpower and equipment resources	- Maintenance Manual - Section C, Chapter 9 Winter Maintenance - Winter Maintenance Standards (Levels) Definitions - Winter Maintenance FAQs
Wyoming	- Budget $22 million annually - Maintain 6,800 miles - Maintenance crews include more than 400 personnel operating out of 56 locations - Fleet of 400 snow plows - Geography is can be divided into three geographical land areas; the Great Plains and Intermountain Basins which are relatively flat, and the Rocky Mountains with a high point greater than 13,000 feet.	Level of Service	Priority plan sets direction for maintenance to remove snow and ice from roadways based on service level classification of the roadways. **High volume (IA, IB) Service:** Interstates and principal arterial and urban routes. Crews work up to 24 hours a day on IA highways and up to 20 hours a day on IB highways. **Medium volume (II) Service:** Lesser used minor arterial routes. **Low volume (IIIA, IIIB) Service:** Other less busy minor arterial and collector routes. Plowed after high-volume and medium-volume routes have been cleared with exceptions for school buses or similar traffic. **Closed (IV) Service-level Roads:** Roads allowed to close seasonally as snow accumulation dictates.	**High volume (IA, IB) Service Goal:** To maintain a bare roadway for driving safely at reasonable speeds. **Medium volume (II) Service Goal:** To keep the roadway passable for drivers who are taking reasonable winter driving precautions with less emphasis on keeping the roadway bare. **Low volume (IIIA, IIIB) Service:** Service is provided only during daylight hours. Level IIIB state highways receive minimum levels of service as resources become available. During severe storms, scheduling depends on available personnel and equipment. **Closed (IV) service-level roads:** The cost of keeping the roads open through the winter overrides the benefits to the few travelers that might regularly use them.	- None directly, but onsite staff reports of road condition serve as confirmation	- Onsite staff	Local foremen determine the amount of effort to apply following a storm event.	Because level of service is based on hours of service, local foremen can adjust hours to cover the intensity of the snow event. WYDOT is also exploring how to compare material, labor and equipment use in relation to a local winter storm scale. They are also exploring if their road condition reporting can be used to measure efforts. For example, if they can establish an average amount of time for shifting conditions from "slick" to "slick in spots, then they could set a target for meeting or exceeding the average time limit.	- Snow Plow Priority Plan

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South Dakota	- $16 million annual budget - 7,810 miles of state highway maintained - 340 full-time and 120 part-time SDDOT employees - Fleet of 443 single and tandem axle snowplows - Geography is split by the Missouri River in central South Dakota. East of the river, there are low hills and lakes formed by glaciers. West of the river, the land consists of deep canyons and rolling plains *Important to note that SDDOT does not plow 24/7; they operate from 5:00am to 7:00pm*	Level of Service	Operational guidelines establishing maintenance activities associated with the removal of snow and ice from roadways. Generally establishes end-of-storm condition, intermediate stages acceptable while obtaining that condition, or frequency of snow and ice control maintenance operations. Two levels of road classification (priority and non-priority routes) have been established with levels of service goals for both during and following an event.	Priority Routes: - Goal during the event is to provide service to remove snow and ice from the pavement surface and shoulders and apply chemicals and abrasives as needed to provide safe passage. The goal of priority service typically is a cycle time of approximately 2 hours. - Goal after the event – provide service to remove snow and ice in a manner such that the driving surface will be 80% clear of snow and ice within 18 hours. Non-Priority Routes: - Goal during the event - Provide service to remove snow and ice from pavement surface and apply chemicals and abrasives as needed to provide safe passage. When possible, final clean-up will be deferred to normal working hours. Non-priority routes are typically serviced approximately every 4 hours as equipment is available. - Goal after the event – provide service to remove snow and ice in a manner such that the driving surface will be 80% clear of snow and ice within 36 hours.	- Staff observations - Materials usage	- Maintenance management records	Level of services results from an analysis of: - Agency snow and ice control policy - Road classifications - Traffic data - Maintenance coverage time periods defined for various operations, including clean-up operations - Equipment types and amounts - Location of facilities - Personnel rules and regulations - Materials used - Special circumstances and conditions	information is used to varying degrees and in a localized fashion by individual maintenance shops. SDDOT is exploring further development of a Winter Severity Index and a Winter Maintenance Response Index as potential methods for characterizing winter severity or maintenance demand in a manner that supports normalized measurement of maintenance activities. WSI is based entirely upon weather data. WMRI is based on a simulation of maintenance activities required to address observed weather conditions. Field demonstrations of both indices were conducted during the winter of 2012-2013. The indices performed well for evaluating maintenance activities on a broad scale but were more variable when used on a maintenance unit basis.	- SDDOT Fact Book 2014-2015 - South Dakota Winter Highway Maintenance Plan 2015-2016 - Development of a Winter Severity or Maintenance Demand Index
South Dakota		Customer Satisfaction Assessment	Assessment of the opinions of key customer groups regarding the composition, importance and delivered quality of SDDOT's key products and services, such as winter maintenance.	No specific targets are established; however, historical and regional benchmarking does occur. Results in 2011 showed 75% of respondents satisfied with plowing/salting/sanding of roads compared to 74% in 2006 (noting hours of plow operation were decreased in the interim). A regional benchmarking survey of residents in other North Central States was conducted to allow valid comparisons. Overall satisfaction with SDDOT was at 82% compared to 81% in 2006 and 78% in 2004 and compared to an average overall satisfaction rating of 75% in surrounding states.	- Customer opinion	- Focus group interviews - Quantitative surveys	Surveys of customer satisfaction have been conducted eight times from 1996-2015. Surveys gather statistically valid data from residents and groups who impact transportation decisions in South Dakota to help identify short- and long-term transportation priorities for the Department. Stakeholder (customer) groups targeted for the assessment include general residents, senior citizens, trucker/shippers, farmers/ranchers, emergency vehicle operators, state legislators, and contractors.	SDDOT shares results with employees and uses findings in its strategic planning process to influence strategic initiatives and help determine areas of emphasis for capital investment, ongoing operations and communication.	- SDDOT 2011 Statewide Customer Satisfaction Assessment
Minnesota	- $88 million annual cost - Maintain over 30,000 lane miles - 1,800 plow operators - Fleet of 800 snow plows - Geography is mostly gently rolling plains with numerous lakes, rivers and streams.	Return to Bare Pavement	This measure tracks the frequency with which MnDOT achieves highway-specific targets over an entire winter season. Measured from the time a winter event ends to when MnDOT's snow and ice operations regain bare-lane driving conditions.	Achieving bare lanes within targeted number of hours after a winter weather event. The target for this measure varies by road classification. Each category of state highway has a targeted number of hours for clearing snow and ice after a winter weather event as shown below: - Super Commuter: 0-3 hours - Urban Commuter: 2-5 hours - Rural Commuter: 4-9 hours - Primary Collector: 6-12 hours - Secondary Collector: 9-36 hours	- Staff observations of are lane regain time	- Currently from visual inspection by plow operators	Results are compared from year to year. MnDOT also 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 several factors (e.g. precipitation, temperature, etc.) to calculate a single relative number. MnDOT has achieved its statewide snow and ice control target in nine of the last 10 seasons.	In severe winters, districts may redirect summer maintenance funds to snowplowing activities. Districts may also use information to counteract rising fuel and material costs.	- Winter Maintenance Report at a Glance (2014-2015) - Annual Minnesota Transportation Performance Report (2014)
Minnesota		Public Satisfaction	MnDOT regularly asks the public to evaluate its performance in a number of different maintenance areas.	Target is customer response of 7.0 or greater which indicates satisfaction. The average respondent was satisfied with MnDOT's snow and ice removal in each of the last five years (2010-2014).	- Customer opinion	- Quantitative telephone survey	Survey has been repeated annually since 2005 (except in 2007). Data is analyzed historically to establish a trend and target level of satisfaction.	Customer satisfaction may be used to inform target setting for return to bare pavement.	- Annual Minnesota Transportation Performance Report (2014)
Minnesota		Normal Condition Regain Time	Traffic data-based measurement process of snow operations that automates the measure of return to bare pavement by using traffic detectors to determine when roadways return to normal conditions by comparing traffic speed, flow, and density.	This was a pilot project to identify a more consistent way of measuring return to bare pavement in place of staff observations. As such, no new targets were established.	- Traffic Speed - Traffic Flow - Density	- Loop detector system	This was a pilot project to identify and assess a more consistent approach to measuring return to bare pavement. Phase I used loop detectors in the Twin Cities metro area to collect traffic speed, flow, and density to estimate when a roadway returned to normal. Phase II analyzed traffic flow patterns during normal and snow conditions and developed traffic data-based measurement process for snow operations.	The process proved effective but is currently limited to data available from the loop detector system in the Twin Cities Metro Area. Freeway use of loop detectors is limited outside the Twin Cities Metro Area. As such, applying this process in other parts of the state would require MnDOT to identify alternate sources for traffic speed and flow data.	- Estimation of Winter Snow Operation Performance Measures with Traffic-Flow Data, Phase 2 (2015)

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North Dakota	- $21 million annual budget - Maintain 17,157 lane miles of roadway - 356 plow operators - Fleet of 356 snow plows, 25 tow plows - Geography is primarily flat in the Red River Valley and Great Plains areas while the Drift Prairie area has rolling hills, stream valleys and numerous lakes *Important to note that NDDOT does not plow 24/7 statewide; limited 24/7 operation in Bismarck, Minot and Fargo areas*	Level of Service	Establishes parameters to manage resources following a storm event to meet desired recovery time for each level of service. Storm events are considered as any weather occurrence that results in an accumulation of snow or ice on the roadway from a thin layer up to and including an 8-inch snowfall during a 24-hour period. Recovery is viewed as all plowable snow/ice is removed but compacted snow/ice could still remain (not necessarily bare pavement).	Roadway classifications and desired recovery time are: - Urban Areas: 1-3 hours - Rural Interstate: 2-6 hours - Interregional System: 2-8 hours - State Corridor: 3-10 hours - District Corridor: 6-12 hours - District Collector: 8-24 hours	- Staff observations	- District maintenance staff	District staff monitor conditions and manage response accordingly during a storm event using MDSS, experience and other tools. Staff also monitor the time following a storm event that it takes to reach the desired recovery condition.	Level of service is primarily used by district staff as a parameter for managing resources. Snow and ice control is also a consistently strong priority throughout NDDOT. Level of service information is not posted publicly and it is not currently tracked within the districts of by Central Office.	- Information from Brandon Beise
North Dakota		Snow and Ice Costs	Measures the cost of snow and ice control by each district. This is a long standing measure with good cost history.	Recently asked to establish target lines (statewide, not by district) based on five-year average costs for reference purposes. Cost information is also put in context with a winter severity index provided by AccuWeather.	- Staff, material and equipment charges	- Department accounting system	Target line costs are being established based on five-year average costs.	Costs are distributed to legislature, executive management, district administration, and district middle management. Target line information is not yet being used for decision making. NDDOT is very decentralized with snow and ice control as a consistently strong priority throughout the department but recent budget cuts are prompting new and different ways of reviewing snow and ice costs more closely.	- Information from Brandon Beise
North Dakota		Customer Satisfaction	Measures customer satisfaction across a variety of transportation topics, including timeliness and effectiveness of snow/ice removal.	Specific targets are not established; rather, trends from survey to survey are monitored for performance.	- Responses from four customer segments: motorists, motor carriers, government officials and businesses	- Telephone survey conducted on a biennial basis	Survey and analysis is conducted by an external party. Data is compared across four customer segments, over time from year to year, and in relation to overall satisfaction.	Survey has been conducted biennially since 2004. Results provide NDDOT with information regarding how well the department is meeting the needs of North Dakota's motorists, motor carriers, government officials, and businesses. NDDOT uses survey results to identify areas of excellence and those in need of improvement.	- Information from Brandon Beise - Customer Satisfaction Survey 2012
North Dakota		Material Usage	Actual amount of salt and sand used in each district, compared to what was recommended in Maintenance Decision Support System (MDSS).	This is a very new assessment and targets have not been established for it.	- Salt used in pounds per lane mile - Sand used in pounds per lane mile - Recommended salt/sand use	- METS database - MDSS	MDSS recommendations for treatment application are compared to actual material usage reported in METS by district. There are issues with the analysis that still need to be addressed, particularly for the Devils Lake area with regard to the significant difference between MDSS recommendations and actual usage.	MDSS is widely accepted in NDDOT. It is viewed as one tool for staff to use when choosing the best snow and ice response. The initial comparisons between MDSS and actual usage was done in 2014 and was continued through 2015 but there are still issues with analysis to be addressed before the information can be used more extensively. Districts have also begun requesting the comparisons with their monthly budget status updates. Since the comparisons started, there has been a decrease in sand usage.	- Information from Brandon Beise
North Dakota		Speed Recovery	When average speeds are reestablished to at or above 90% of pre-storm speeds (4-hr average) and are sustained for a period of 1 hour.	This is a prospective winter measure being developed by NDDOT to determine how well maintenance practices meet desired levels of service. Maintenance is developing a summary of objectives and procedures for management to determine a statewide course of action.	- Speed	- ATR - WIM NDDOT will use existing ATR and WIM data for simple speed data during initial trial stages. Other data sources (e.g. NPMRDS) could be explored for future, broader application.	Speeds are analyzed before, during and after a winter storm event for when they return to levels at or above 90% of pre-storm speeds. Storm trigger requirements and storm expiration requirements have been established to identify an event as a storm and to delineate when speed recovery time starts to be measured. If another storm event starts within 3 hours of the end of the previous storm, the two events are to be combined.	This pilot project will help shape the direction of the measure and how it could potentially be used in decision-making.	- Information from Brandon Beise

State	Source	Location	Phone	Email	Notes
Washington	**James Morin, Maintenance Operations Branch Manager**		**360-705-7803**	**morinj@wsdot.wa.gov**	**From Bill Legg**
Washington	Maintenance Performance Measures	http://www.wsdot.wa.gov/Maintenance/Accountability/default.htm			From Bill Legg
Washington	MAP Level of Service Definitions	http://www.wsdot.wa.gov/Maintenance/Accountability/los.htm			From Bill Legg
Washington	2015-2017 MAP Targets	http://www.wsdot.wa.gov/NR/rdonlyres/4C851083-16BF-4526-989F-22B8FC15143D/0/MAPTargetchart.pdf			From Bill Legg
Washington	MAP Field Data Collection Manual	http://www.wsdot.wa.gov/NR/rdonlyres/047506 8D-CE61-4EFB-B785-157315E7F7BF/0/FieldDataCollectionManual.pdf			From Bill Legg
Washington	MAP Manual	http://www.wsdot.wa.gov/Maintenance/Accountability/mapmanual.htm			From Bill Legg
Washington	2015-2017 Statewide Priority Matrix	http://www.wsdot.wa.gov/NR/rdonlyres/0F80C02B-8FF6-42CF-8E55-5BA83337DDDE/0/LOSPriorities.pdf			From Bill Legg
Washington	CY2014 MAP Service Level Report - Statewide	http://www.wsdot.wa.gov/NR/rdonlyres/B5A62A60-D332-414C-BE91-AE4790CD8208/0/Statewide_comb.pdf			From Bill Legg
Washington	Statewide Snow and Ice Plan 2015-16	http://www.wsdot.com/winter/snowiceplan.htm?_ga=1.105464576.2049147996.1457452427			From James Morin
Idaho	**Dennis Jensen, Winter Maintenance Coordinator**		**208-334-8472**	**dennis.jensen@itd.idaho.gov**	**From Tony Ernest**
Idaho	Development of Winter Maintenance Performance Measures - paper from ITS World Congress (2013)	https://itswc.confex.com/itswc/AM2013/webprogram/ExtendedAbstract/Paper11335/Winter%20Maintenance%20Performance%20Measures%20over%202.pdf			From research and confirmed by Tony
Idaho	Idaho TD Winter Maintenance Performance System – excerpt from Best Practices for Road Weather Management (2012)	http://www.ops.fhwa.dot.gov/publications/fhwahop12046/rwm10_idaho1.htm			From research and confirmed by Tony
Idaho	Idaho's Winter Performance Measures – presentation at Western States Forum (2013)	http://www.westernstatesforum.org/Documents/2013/presentations/Idaho_Jensen_FINAL_WinterMaintenancePerformanceMeasures.pdf			From research and confirmed by Tony
Idaho	ITD Malad foreman Thorpe again sets ITD road-clearing standard – article from The Transporter (10/23/15)	http://itd.idaho.gov/transporter/2015/103015_Trans/103015_D5ThorpeAgain.html			From research and confirmed by Tony
	Department Memorandum Regarding TTO Requirements for 2016	File in project folder			From Dennis Jensen
Idaho	Transportation Technician Operations (TTO) Step Pay Program Policy	File in project folder			From Dennis Jensen
Montana	**Doug McBroom, Maintenance Operations Manager**		**406-444-6157**	**dmcbroom@mt.gov**	**From Brandi Hamilton**
Montana	Past and Current Practices of Winter Maintenance at the Montana Department of Transportation (2003)	http://www.mdt.mt.gov/publications/docs/brochures/winter_maint/wintmaint_whitepaper.pdf			From Brandi Hamilton

Montana	Winter Maintenance Standards (Levels) Definitions (1997)	http://www.mdt.mt.gov/publications/docs/brochures/winter_maint/levelrpt.pdf			From Brandi Hamilton
Montana	Winter Maintenance FAQs	http://www.mdt.mt.gov/travinfo/travinfo_faq.shtml			From research
Montana	Maintenance Manual - Section C, Chapter 9 Winter Maintenance (2009)	http://www.mdt.mt.gov/publications/manuals/maint_manual.shtml			From research
Wyoming	**Kent Ketterling, State Maintenance Engineer Cliff Spoonemore, Maintenance Staff Engineer**		**307-777-7051**	kent.ketterling@wyo.gov cliff.spoonemore@wyo.gov	**From research**
Wyoming	Snow Plow Priority Plan	http://www.dot.state.wy.us/home/travel/winter/snow_plow_priority_plan.html			From research
Wyoming	Keeping up with Maintenance	http://www.dot.state.wy.us/home/engineering_technical_programs/field_operations/state_maintenance_office/contentA/mainContent_1741.html			From research
South Dakota	**- Craig Smith, Mitchell Area Region Engineer - Jason Humphrey, Operations Support Program Manager - John Mehlhaff, Winter Maintenance Coordinator - Daris Ormesher, Research Project Engineer**		**605-995-8129 605-773-3571**	**craig.smith@state.sd.us jason.humphrey@state.sd.us john.mehlhaff@state.sd.us daris.ormesher@state.sd.us**	**From Dave Huft**
South Dakota	SDDOT Fact Book 2014-2015	http://www.sddot.com/resources/Reports/DOTFactBook.pdf			From research
South Dakota	South Dakota Winter Highway Maintenance Plan	File in project folder			From Dave Huft
South Dakota	Development of a Winter Severity or Maintenance Demand Index	File in project folder			From Dave Huft
South Dakota	SDDOT Annual Report 2014	http://www.sddot.com/resources/reports/2014AnnualReport.pdf			From research
South Dakota	SDDOT 2011 Statewide Customer Satisfaction Assessment	File in project folder			From Dave Huft
North Dakota	**Brandon Beise**		**701-328-4359**	**bbeise@nd.gov**	**From Brandon Beise**
North Dakota	Information from Brandon	Email .pdf file in project folder			From Brandon Beise
North Dakota	Customer Satisfaction Survey 2012	https://www.dot.nd.gov/divisions/exec/docs/CustomerSatisfactionSurvey2012.pdf			From research
Minnesota	**Tom Peters**		**651-366-3578**	**tom.peters@state.mn.us**	**From Dan Rowe and Tom Peters**
Minnesota	Winter Maintenance Report 2014-15 At A Glance	http://www.dot.state.mn.us/maintenance/pdf/wintermain20142015ataglance.pdf			From Dan Rowe and Tom Peters
Minnesota	Annual Minnesota Transportation Performance Report - Snow and Ice Control (2014)	http://www.dot.state.mn.us/measures/pdf/2014PerformanceReport.pdf			From research
Minnesota	Performance Measures and Target Adoption	http://www.dot.state.mn.us/policy/admin/ad006.html			From research
Minnesota	Estimation of Winter Snow Operation Performance Measures with Traffic-Flow Data,	http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2462			From research
Geographic Information		http://www.netstate.com/index.html			