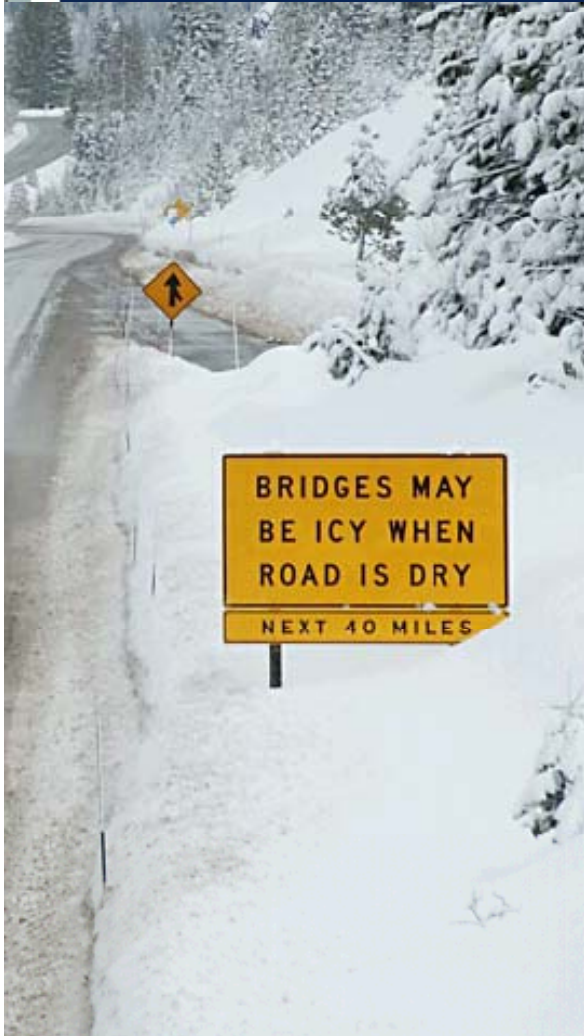




WINTER OPERATIONS COALITION



Bill Hoffman

I-80 Corridor Coalition FALL WORKSHOP

October 27th, 2010





WINTER OPERATIONS COALITION



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Links

TRAVELER INFORMATION

California

[Sacramento Region Travel Info \(511\)](#)

[California Department of Transportation](#)

[Get Across I-80](#)

Utah

[Utah Commuter Link.com](#)

Nevada

[NDOT - Safe Travels USA](#)

Wyoming

[WYDOT Traveler Information Service](#)

OTHER COALITIONS

Other Resources

[NCHRP \(20-68A\) Best Practices in Winter Maintenance Final Report](#)

[NCHRP \(20-68A\) Scan of Winter Maintenance Best Practices Presentation](#)

[Virtual Trip Map of NCHRP\(20-68A\) Scan](#)

[Video of Utah DOT Using the Tow Plow](#)

Important Websites

- www.aurora-program.org/knowledgebase
- www.dot.state.mn.us/maintenance/training.html
- www.clearroads.org

SUSTAINABILITY



[Courtesy - Xianming Shi](#) – Western Transportation Institute

The Economic Costs of Disruption from a Snowstorm

Study Prepared for the American Highway Users Alliance by IHS Global Insight

Executive Summary

This study, commissioned by the American Highway Users Alliance and carried out by renowned global consulting firm IHS Global Insight, quantifies the economic impact of a one-day snow-related shutdown in sixteen states and two Canadian provinces. As winter comes to a close after an abnormally heavy snow season, the study shows the significant expense, both directly and indirectly, a major storm has on businesses and government because of impassable roads, as much as \$300-700 million in some states for just a one-day shutdown.



3. The economic impact of snow-related closures far exceeds the cost of timely snow removal. Although states and localities may be hesitant to expend significant upfront resources in the short-term, the long-term payoff more than justifies the expense.

sales and income and sales tax revenues, roughly double the initial economic impact.

3. The economic impact of snow-related closures far exceeds the cost of timely snow removal. Although states and localities may be hesitant to expend significant upfront resources in the short-term, the long-term payoff more than justifies the expense.



It is hoped that this data will highlight to state and local authorities, as well as the federal government, the immense costs incurred during these storms, and spur them to plan more aggressively for periods of heavy snow.

Cost of a One-Day Storm

Utah		
Total Economic Impact		\$ Millions
Direct	30.68	
Derived	35.68	
Total	66.36	

Wages & Salaries		
Direct	18.29	
Derived	24.51	
Total	42.81	

State & Local Taxes		
Direct	0.85	
Derived	1.13	
Total	1.98	

Federal Taxes		
Direct	1.42	
Derived	1.90	
Total	3.32	

Retail Sales		
Direct	10.12	
Derived	8.14	
Total	18.26	

Wisconsin		
Total Economic Impact		\$ Millions
Direct	69.35	
Derived	79.33	
Total	148.68	

Wages & Salaries		
Direct	44.00	
Derived	58.96	
Total	102.97	

State & Local Taxes		
Direct	2.23	
Derived	2.99	
Total	5.22	

Federal Taxes		
Direct	3.59	
Derived	4.81	
Total	8.41	

Retail Sales		
Direct	19.52	
Derived	12.57	
Total	32.09	

Department of Legislative Services
Maryland General Assembly
2010 Session

FISCAL AND POLICY NOTE

Revised

Senate Bill 775

(Senator Kramer, *et al.*)

Education, Health, and Environmental Affairs

Environmental Matters

Transportation - Road Salt Management - Best Practices Guidance

This bill requires the State Highway Administration (SHA), in consultation with the Maryland Department of the Environment (MDE), to develop a road salt management best practices guidance document by October 1, 2011, for use by local jurisdictions and the State to minimize the adverse environmental impacts of road salt runoff in the State. SHA must update the guidance document annually and make it available online.

Fiscal Summary

State Effect: SHA can develop and update the guidance document with existing budgeted resources; however, limited staff resources may be diverted from other responsibilities. Transportation Trust Fund expenditures may increase in FY 2012 and future years to the extent the guidance document requires SHA to implement new road

Clarus Map Interface - Microsoft Internet Explorer provided by Nevada DOT

http://www.clarus-system.com/ClarusMap.html?lat=39.4&lon=-116.6&zoom=7

File Edit View Favorites Tools Help

Clarus Map Interface

Station Code: Lat, Lon: 39.842286, -127.727051

Retrieving station data ...

Map showing station locations across the western United States (California, Oregon, Idaho, Nevada, Utah, Arizona, Wyoming, Colorado, New Mexico). Major cities and geographical features are labeled. A red text overlay reads "Retrieving station data ...".

Map controls: Home (Re-center map on ...), Navigation (Home, Back, Forward, Stop, Refresh, Zoom In, Zoom Out, Full Screen), Scale (0 to 1000 meters), Date/Time (2010-10-11 21:37 UTC)

Map data: © 2010 Europa Technologies, Google, NEGI, TerraServer, etc.

Map interface: (Select Data to Show), Metric, English

Windows taskbar: Done, Internet, 100%, 2:37 PM

Taskbar icons: Start, Internet Explorer, Outlook, PowerPoint (mdss snow ppt - G...), Clarus Initiative, Clarus Map Inter..., Dist_2 Maint.pptx, 3TRBWeather06.p...

Map showing Reno, Sparks, and Lake Tahoe area. A popup window displays station data for station 509001 at Cisco Grove.

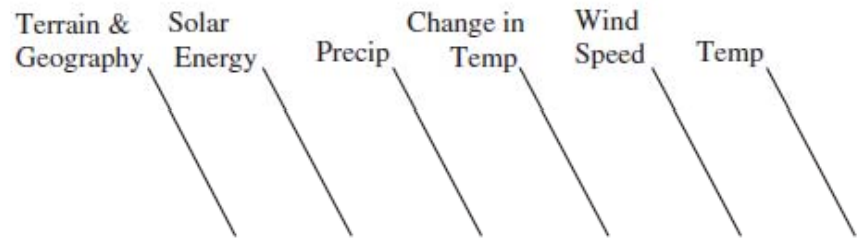
509001 Cisco Grove Lat, Lon: 39.316257, -120.486936 Elevation: 1851 m			Complete	Manual	Sensor Range	Climate Range	Step	Like Instrument	Persistence	Barnes Spatial	Dewpoint	Sea Level Pressure
Timestamp (UTC)	Observation Type	Value										
2010-10-11 21:15	essAirTemperature (F)	65.93	●	—	●	●	●	●	●	●		
2010-10-11 21:15	essDewpointTemp (F)	39.47	●	—	●	●	●	●	●	✗		
2010-10-11 21:15	essRelativeHumidity (%)	38.00	●	—	●	●	●	●	●	●		
2010-10-11 21:15	precipType	3.00	●	—	●							
2010-10-11 21:15	windSensorAvgDirection (deg)	75.00	●	—	●	●	●	●	●			
2010-10-11 21:15	windSensorAvgSpeed (mph)	10.56	●	—	●	●	●	●	●			
2010-10-11 21:15	windSensorGustDirection (deg)	75.00	●	—	●	●	●	●	●			
2010-10-11 21:15	windSensorGustSpeed (mph)	13.05	●	—	●	●	●	●	●			

Retrieving station data



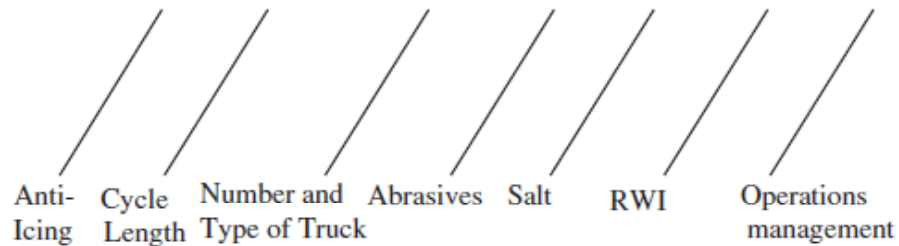
Snow & Ice = Rocket Science ?

Environmental
Conditions =
Storm Severity



Remove Snow and Ice - Outputs

Inputs = Labor,
Equipment,
Materials,
Management,
and Information
quality and
quantity

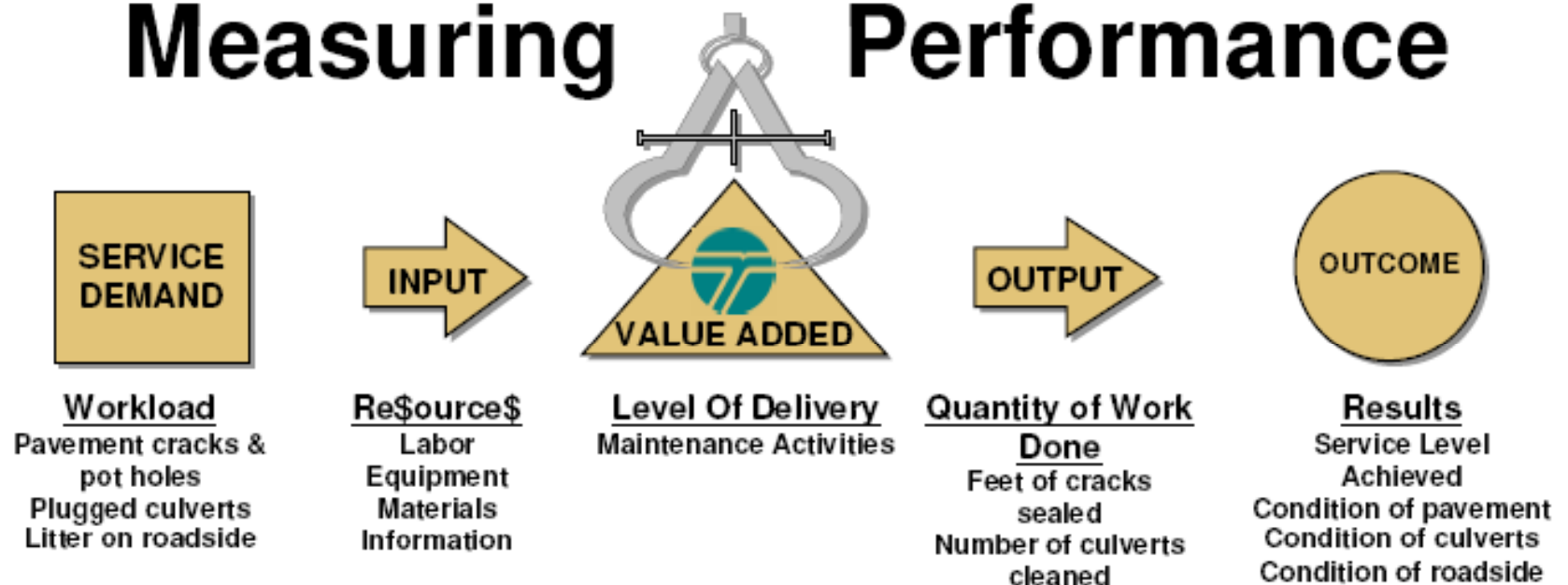


Desired Outcome =
Customer
Satisfaction



Time to Bare
Pavement

Measuring Performance



Performance Measures:



MAP Measures Outcomes

Outcomes - Measure the result (outcome)

- Examples:
- Service level rating
 - Sq. ft. of deficient pavement per lane
 - Per cent of culverts plugged
 - Amount of litter per system mile of highway

Outputs - Measure the quantity of work done.

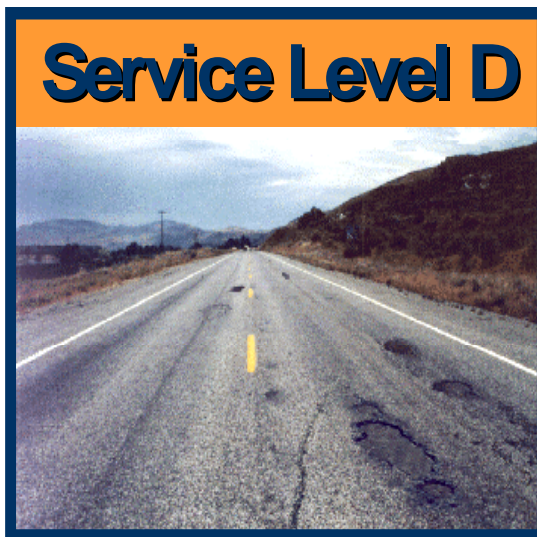
- Examples:
- System miles maintained
 - Feet of crack sealed
 - Number of culverts cleaned
 - Cubic Yards of litter picked up

Performance Measures





- Inputs – Labor Hours, Equip. Hours, Tons
 - Outputs – Miles Treated, Miles Plowed
-
- Outcomes – Bare Lanes two hours after storm, A LOS Rating, Traffic Speeds, Reduced Delay
 - Value to the Customer – No accidents, savings of \$X00,000 to the community

Visual Representation - Level of Service Ratings

Excellent

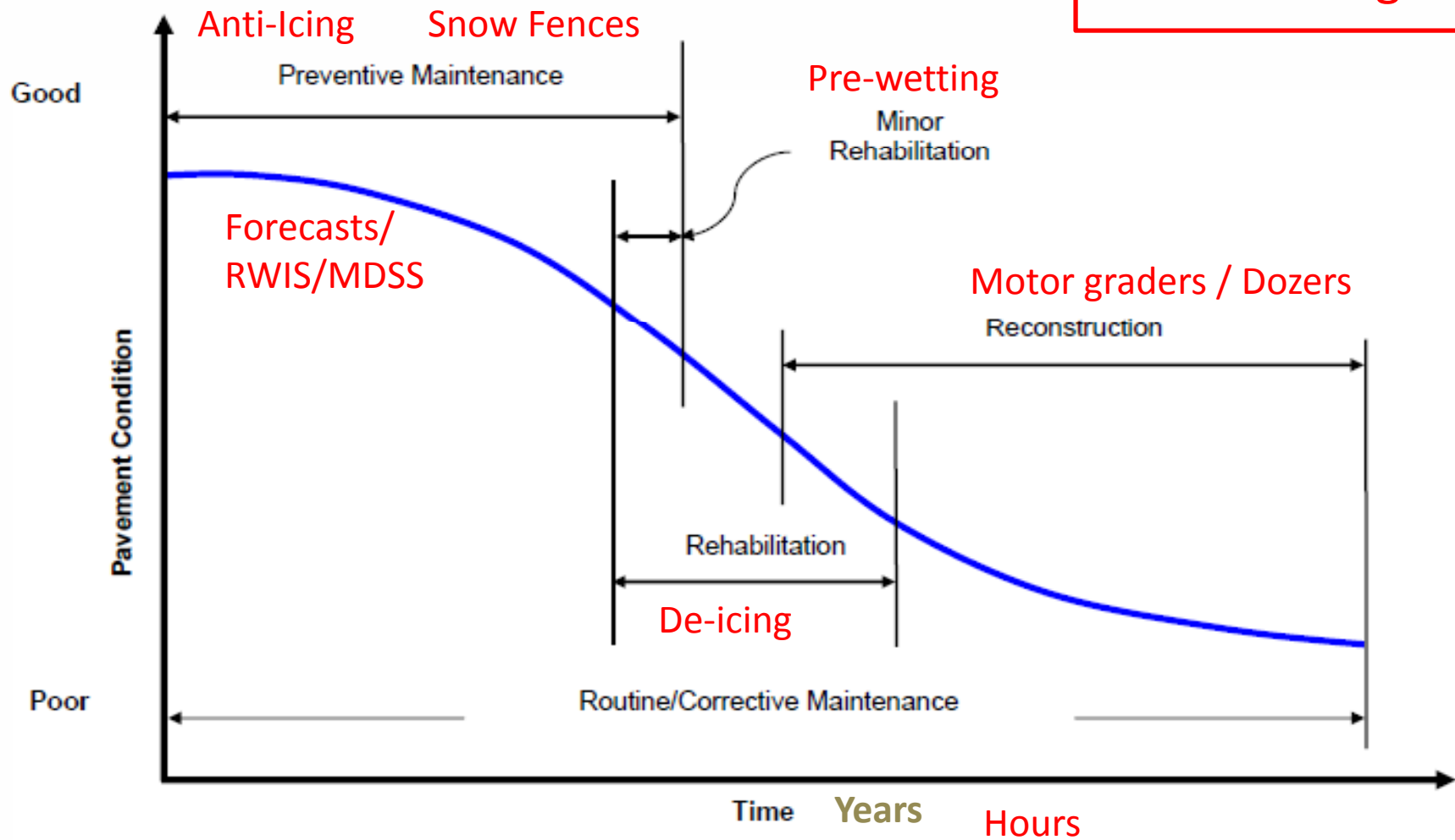


Poor

Expected Season LOS	Expected Road Condition after Treatment Completed
<p>A to B</p>	<p>Snow or ice buildup encountered rarely. Bare pavement attained as soon as possible. Travel delays rarely experienced.</p> 
<p>B To C</p>	<p>Snow or ice build up encountered at times but infrequent. Travel at times may experience some isolated delays with roads having patches of black ice, slush, or packed snow.</p> 
<p>C to D</p>	<p>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.</p> 
<p>D to F</p>	<p>Compact snow buildup encountered regularly. Traveler will experience delays and slow travel.</p> 

Illustrating the Definition

WM Asset Mgmt.



Performance Based Budgeting

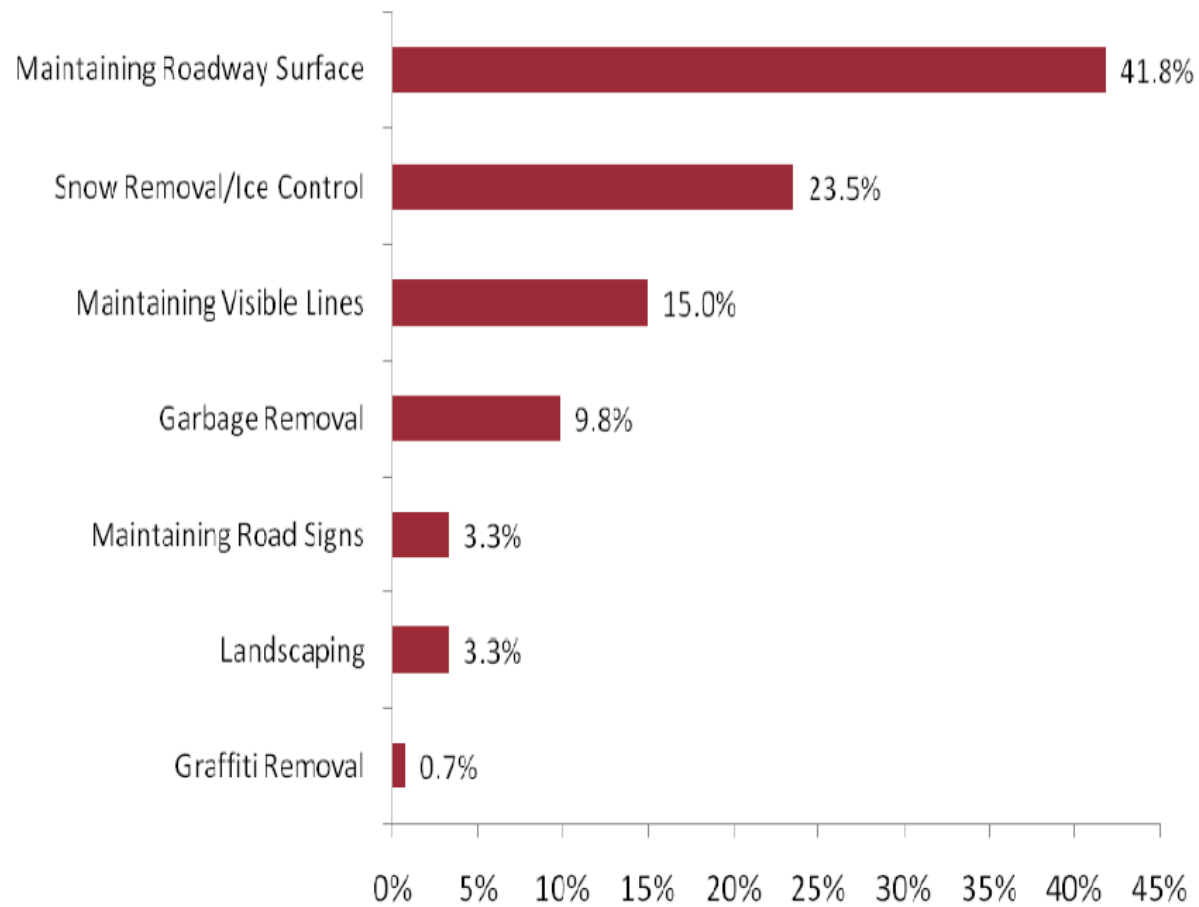
Station 1421

FY 2006 Front Line Asset Management Review Sheet

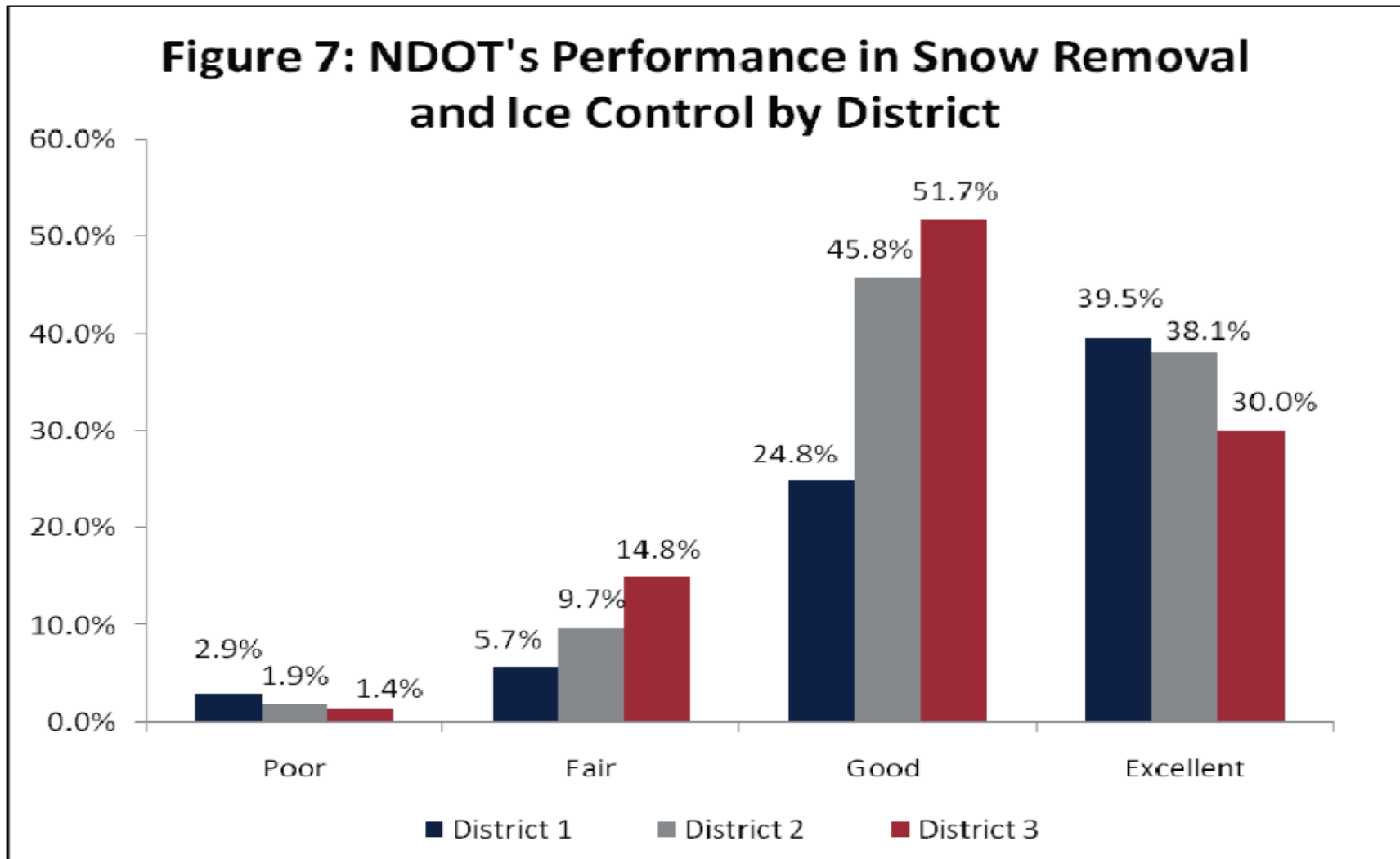
Group	Description	FY 2006 Target	Station Performance		Deviation from Target		Station Budget	Station Budget Spent	Station Budget Spent	Overspending on Compliant Features	Underspending on Deficient Items
			FY to Date	Most Recen	FY to Date	Most Recen					
1A1	Snow Removal	B+	A+	NA	3	0	\$120,184	\$116,455	97%		
3A1	Shoulder Work	B-	B+	B+	2	2	\$31,404	\$31,407	100%	0.00%	0.00%
4A1	Litter	B	C+	C-	2	4	\$7,686	\$7,162	93%	0.00%	0.34%
4A3	Fence	B	NA	NA	0	0	\$0	\$0	0%	0.00%	0.00%
5A1	Weed Control	B	F-	F-	10	10	\$15,057	\$816	5%	0.00%	9.26%
5A2	Vegetation Obstruction	B	F-	C-	10	4	\$9,956	\$6,651	67%	0.00%	2.15%
5A3	Mowing	B	B-	D-	1	7	\$10,032	\$7,348	73%	0.00%	1.75%
6A1	Grade and Clean Ditches	B-	C	D+	2	4	\$5,536	\$45,395	820%	0.00%	0.00%
6A2	Maintain Inlets	B-	B+	B	2	1	\$23,374	\$16,777	72%	0.00%	0.00%
6B1	Erosion Repair	B-	A+	A+	5	5	\$2,135	\$1,506	71%	0.00%	0.00%
8A3	Repair and Replace Signs	A	A	A	0	0	\$20,526	\$17,277	84%	0.00%	0.00%
8A4	Repair and Replace Delineation	A	A-	B+	1	2	\$10,026	\$5,493	55%	0.00%	2.95%
8A5	Guardrail Maintenance	A			14	14	\$1,974	\$136	7%	0.00%	0.00%
8A8	Sweeping	A	D-	D-	10	10	\$14,981	\$12,300	82%	0.00%	1.74%
8A9	Curb, Gutter, and Island	A	A+	A+	1	1	\$1,062	\$1,888	178%	0.54%	0.00%
Totals					60	64	\$153,749	\$154,156	100%	0.54%	18.19%
Current MMQA Budget Deviation								0.26%			

Customer Surveys

Figure 22: Priority of NDOT Maintenance Activities for NDOT District 2



Customer Surveys



MDSS Benefits: Predicted & Realized



Predicted

- Same level of service with less cost
 - 23% material savings in New Hampshire study
- Achieve better level of service at same cost
 - 10-15% less “unacceptable” conditions in New Hampshire study
- 8:1 Benefit/Cost Ratio New Hampshire
- Similar studies performed in MN, CO
- Only salt costs considered

Realized

- Indiana first-year statewide deployment 2008/2009
 - \$12M saved salt use
 - \$1.3M saved overtime/fuel
 - **\$11M (of \$40M) saved overall after normalizing for winter conditions**
- Mitchell Region (SD) event \$60/mile versus \$300/mile
- Minnesota estimate ~50% material saved at defined level of service
- More consistent winter maintenance



Alaska's Smart Vehicle System

WTI Survey of Snowplow Operators

- 992 operators from Idaho, Montana, North Dakota, and Wyoming DOT's.
 - 30% indicated that they lost sight of the roadway and shoulders 4-6 times during an average snowstorm.
 - 83% indicated that if a device existed that would allow for drivers to determine lane position, it would be very useful.



VHF DGPS Antenna

Radar Receiver

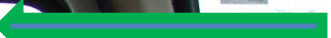
GPS Antenna



Projector



Head-up-display
Image Combiner





Projector screen with reversed image

Smart Vehicle Project Cost

- **Cost**
 - Phase I - \$244,800.00
 - Equip 2 trucks
 - Differential GPS Station
 - Electronic Map Highway
- **Cost**
 - Phase II - \$550,478.00
 - Equip 3 trucks
 - Antenna Tower Foundation and 120' Tower
 - Differential GPS Station, Integration of vehicles and stations
 - Electronic Map Highway

Tow Plow



Tow Plow w/spreader and liquid tank







Tow Plow with On-
Board Power for
Hydraulics



INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

Seymour District
Technical Services Department

SAFETY / MOBILITY

FORECASTS / CONDITIONS

DOT Decisions

Traveler
Decisions

Deployment

Operations

Go/No-GO

WHAT WILL HAPPEN ?

WHAT IS HAPPENING?

WHAT HAPPENED?



Can We Make a Difference ?

- Linking Traffic Management Centers
- Focusing on Freight Reliability/Mobility
- Maximizing Winter Operations Efficiency





Initial Coalition Structure

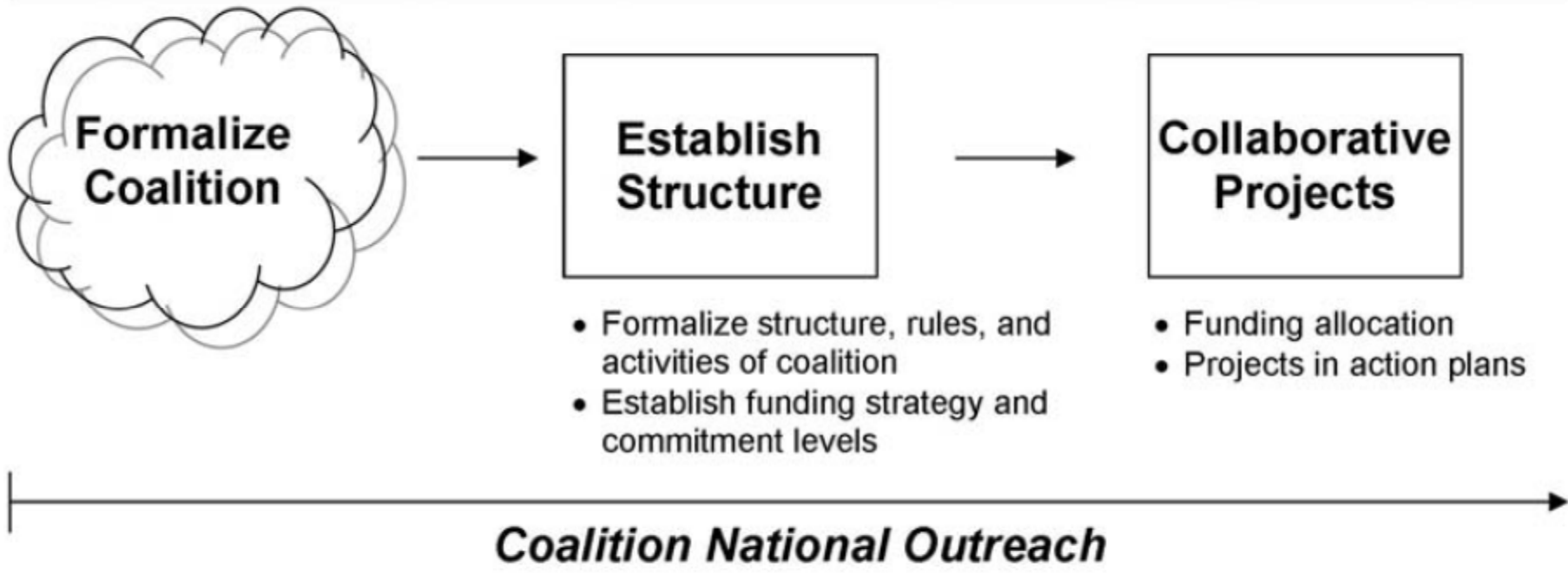
INITIAL COOPERATION





Anticipated Coalition Structure

FORMALIZATION AND MOVING AHEAD





Coalition Work Completed

- Website
- Strategic Plan
- Action Plan
- Aggressive Marketing & PR Efforts
- Freight Action Plan
- Common 511 Road Descriptors Survey
- Winter Maintenance Best Practices
- Tiger II Planning Grant Application
- IntelliDrive Application



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Coalition Products

- [Coalition White Papers](#)
- [Coalition Strategic Plan](#)
- [Coalition Action Plan](#)
- [Meeting Materials](#)
 - Agendas
 - Meeting Minutes
 - Other Material





WINTER OPERATIONS COALITION



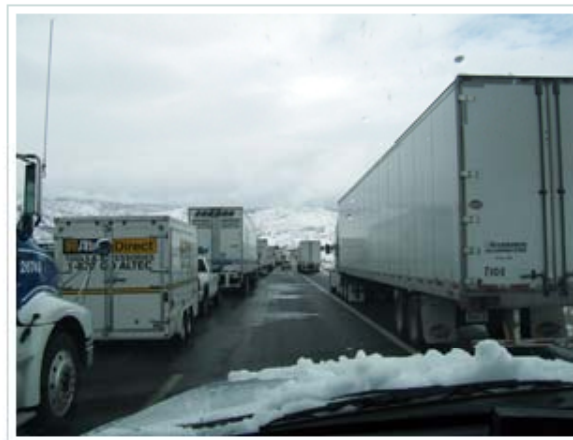
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Freight

The I-80 Coalition has prepared a Freight Coordination and Action Plan as guidance in involving the freight community in the strategies that will be developed for I-80. The following is the link to view the plan:

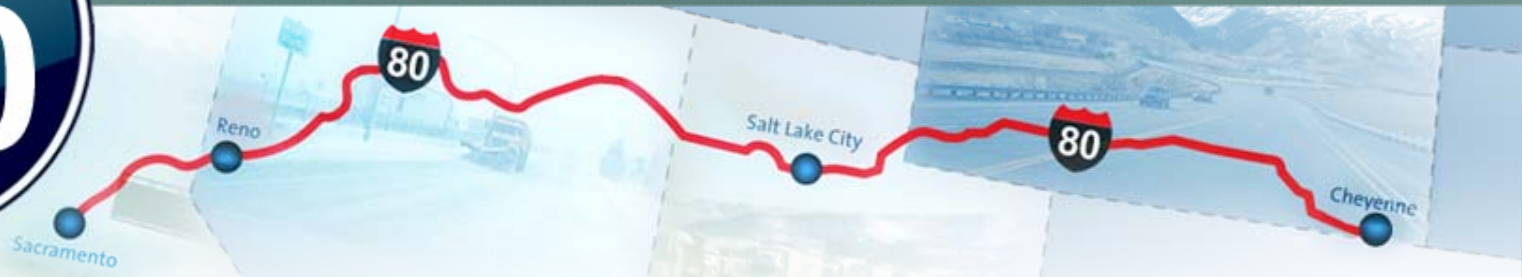
[Freight Action and Coordination Plan \(pdf\)](#)

Dan Kuhn, the Utah DOT Freight and Railroad Planner provided insight into I-80 freight issues. The following were provided for the I-80 Coalition to consider.





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Best Practices

STATE-SHARED RESOURCES

- [Programs/Operations](#)
- [Equipment/Vehicles](#)
- [Material/Chemicals](#)
- [State Case Studies](#)



Workshop Charge

- Freight Input / Focus Area Guidance
- Vendor / Private Sector Input
- Best Practices for Interstate Coordination
- Best Practices for Winter Maintenance
- Strategic Direction for Continued Efforts
- ACTION ITEMS for the Upcoming Year

DATA IS KING !!

- Automated Vehicle Location Systems
- Populate 511 and Maint. Mgmt. Systems
- Apps for PDAs
- Storm Management Systems



Traffic Operations/TMCs

- Traffic management operations during winter conditions.
- Regional truck parking coordination during ice and snow events.
- TMC integration, coordination, and sharing information between states.
- Consistent level of service and weather and road condition descriptors.
- Communication between states' TMCs and maintenance divisions to support traffic activities.
- Need to share information on best practices, new technologies, etc. among Coalition members.



Infrastructure/Communications

- Adequate coverage of traffic in rural areas and robust coverage in urban areas.
- Efficient use of ITS device data and potentially shared use.

Performance Measures

- Data collection method and archiving.
- Performance measures and monitoring using data to show progress and justify concerns.



Traveler Information

- Expand methods to disseminate information efficiently and effectively to travelers.
- Consistent content guidelines for traveler information.
- Available traveler or road closure information for the corridor across county, state, and district boundaries.

Weather Forecasting

- Coordination between states from a weather perspective before a storm hits.
- Forecast data inputs to operations/maintenance decisions.
- Leverage existing weather programs.
- Better weather and database integration for winter operations and management.



Maintenance Support and Equipment

- Distribute the impact of trucks and traveler information available to trucks on I-80 across the states.
- Operational understanding of neighbor states' maintenance activities.
- Communication between states' TMCs and maintenance divisions to support maintenance activities.

Freight

- Communication with trucking industry and travelers.
- Traveler information specific to freight community, and need to have a better understanding of freight-specific needs and issues.
- Targeted surveys of corridor users, with emphasis on freight community.



Staffing/Training

- Direct communications process established between all states.
- Retention of experienced staff and proper training to support operations and maintenance.
- Educating the Public and Road Users on our capabilities and the importance of what we're trying to accomplish.

NCHRP Research Project

A Strategic Plan for Winter Maintenance

National “GRAND” Challenges

1. Comprehensive Communications Capability
2. Services & Procedures that Balance Social, Environmental and Economic Factors
3. Systems Management for a Consistent & Reliable Transportation Network
4. Deploying New Technology for Winter Maintenance
5. Lack of Recognition of the Value of Winter Maintenance
6. Work Force Recruiting & Retention



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