

# Executive Summary, Research Readiness Level Assessment, and Technology Transfer

## Correlation Analysis of MDSS and NEWINS

### Research Objectives

The following tasks were conducted as part of this study:

1. Background literature review of training manuals to understand the capabilities and limitations of the MDSS,
2. Data collection of MDSS forecasts, material usage, costs incurred, INRIX speed data, and meteorological data for the NEWINS,
3. Computation of a corresponding NEWINS value based solely on MDSS forecasts,
4. Comparison of NEWINS-MDSS value to stand-alone NEWINS value, (5) sensitivity analysis to validate both MDSS forecasts and NEWINS values, and
5. Public outreach campaign internally and externally to better communicate the role / tools NDOT uses to keep roads safe and mobile

### Research Benefits

NDOT communication with internal staff, external partners and the general public is crucial to promote proper adoption and mutual understanding of the limitations and challenges to winter maintenance operations given the complexity and uncertainty of weather forecasts.

Internally, independent scrutiny of the MDSS offered increased confidence in its performance. An independent correlation between the MDSS and NEWINS promoted greater adoption of both tools by internal and external MDSS PFS stakeholders.

Last, the public outreach campaign component of this research developed an informational hazard matrix that was disseminated on various platforms such as social media, dynamic message signs, mobile applications, etc.

### Background

Improving winter maintenance is a goal of most transportation agencies including the Nebraska Department of Transportation (NDOT). One approach is to develop a decision support system to aid in the winter maintenance recommendations. Iteris has developed a maintenance decision support system (MDSS) and has teamed up with NDOT to provide winter weather guidance for operations. This report investigates how well the MDSS functions for several routes across Nebraska for different storm systems.

### Conclusion

The analysis was performed from saved events within MDSS and compared to meteorological observations during different storm events, mainly Colorado or Alberta Clipper type storms that moved through and affected different regions of Nebraska. Winter severity index for the State of Nebraska (NEWINS) values were calculated for the years of study and NDOT maintenance districts around the state where the individual route segments are found.

The NEWINS values were then analyzed and compared to the MDSS conditions. The NEWINS values compared favorably with the MDSS conditions, highlighting the impacts of the storms. The weather conditions produced and reported within MDSS equated well to the observational data with minor variations due mainly to differences in the distance between the route segment studied and the observation point location. There were some forecasting variations between what was observed and what was being forecasted within MDSS. Some of the variations were probably meteorological in nature; however, some were within MDSS resulting in inaccuracies in the forecasts.

In most cases when there were variations in the forecast, the MDSS forecast predicted snowfall over a longer period of time which also resulted in some cases with more forecasted snowfall than what was observed within MDSS. During the analysis, there were a few non-meteorological finds of importance. The major finding was that the route segment length had a large influence on the parameters obtained for that segment within MDSS compared to segments of smaller lengths making comparison between routes a little sensitive.

### Principal Investigator

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### NDOT Lead TAC Member

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Final report is available:  
[HERE](#)

## NDOT Recommendations Based Off Research Project - 2020

The research provides a framework to evaluate the accuracy and completeness of the MDSS weather forecasts. Confidence in the capability of MDSS is improved and a method for evaluating storm events in the future has been developed. NDOT can use these techniques for Post Storm evaluation. Maintenance personnel will use the research to better understand the strengths and limitations of MDSS to support winter operations. Information will be provided to Maintenance personnel during annual fall training that helps them understand how the research applies to their work.

- As provided by Mike Mattison, Lead TAC Member

## NDOT Recommendations Based Off Research Project - 2025

The research presents a framework for evaluating the accuracy and completeness of MDSS (Maintenance Decision Support System) weather forecasts. Since 2022, the Department has assessed the system's ability to generate storm-specific maintenance forecasts. To enhance winter operations, maintenance personnel received training to better understand the strengths and limitations of MDSS. As shown in Figure 1, 78% of the MDSS recommendations were accepted. The Department will continue use the MDSS recommended materials as well as maintenance personnel training. Figure 1 dashboard is also showing the material Cost, recommended vs. actual material (\$).

- As provided by Mike Mattison, Lead TAC Member

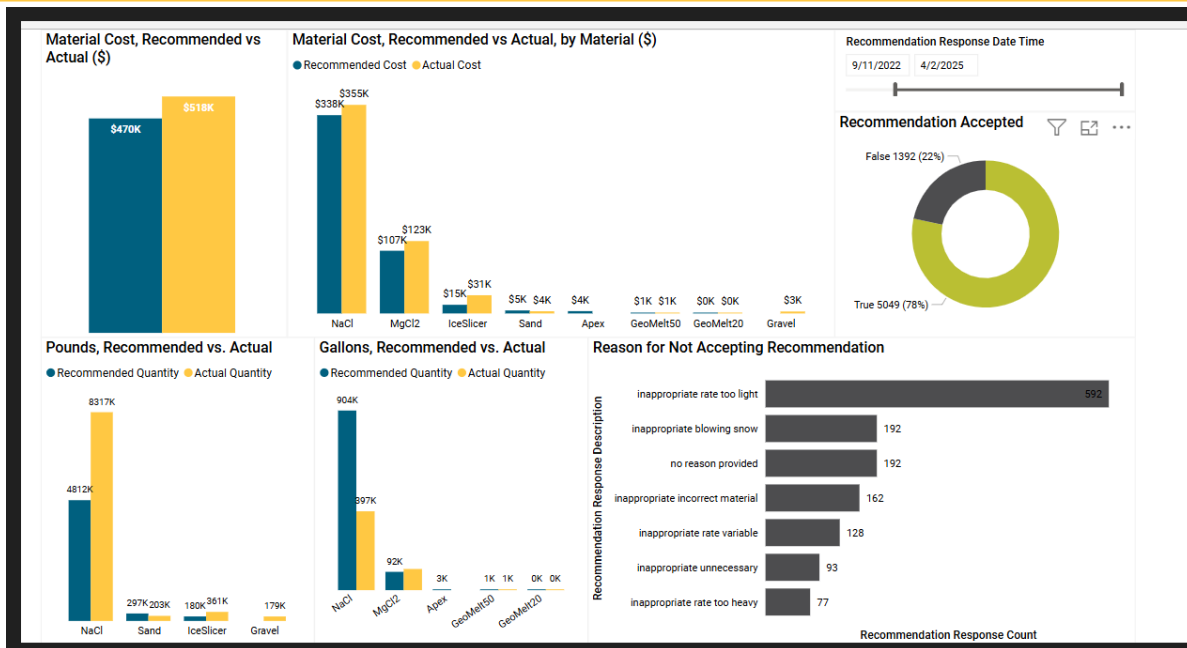


Figure 1. MDSS Dashboard

## Research Readiness Level (RRL) Assessment

### Level 5: Standard Practice / Fully Understood

Research adopted, no further evaluation required. - Moved up from RRL Level 4, assessed in 2020

**RRL 5**

This brief summarizes Project SPR-P1 (19) M081 "Correlation Analysis of MDSS and NEWINS" Nebraska Department of Transportation Research Program